Vol. 891 Number 4

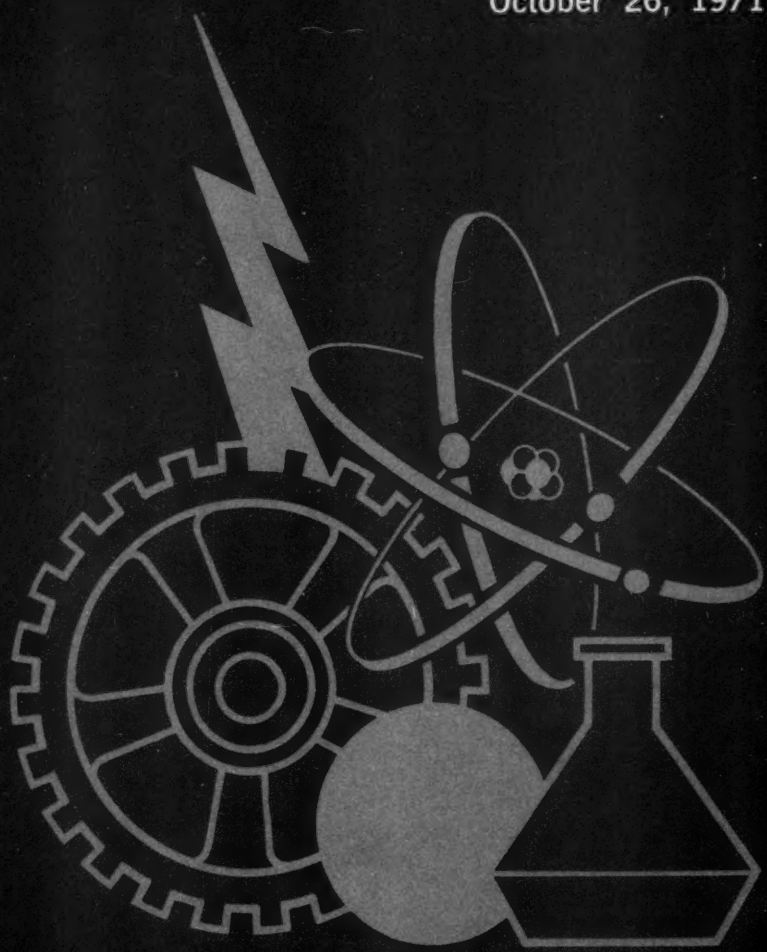
OFFICIAL GAZETTE

of the
UNITED STATES PATENT OFFICE

A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

PATENTS

October 26, 1971



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OFFICIAL GAZETTE of the UNITED STATES PATENT OFFICE

October 26, 1971 Volume 891 Number 4

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PATENT OFFICE NOTICES

TRADEMARKS

Status Inquiries; Amendment

The notice entitled Status Inquiries which appeared in the Federal Register of August 11, 1971 (36 F.R. 14771–14772), indicated that all status inquiries regarding trademark applications will be entered in the application files. That procedure will not, however, be followed in all cases, and the first paragraph of the notice has, accordingly, been amended to read as follows:

"In order to expedite the handling of inquiries regarding the status of both new and amended applications, the Patent Office has adopted a new procedure. Henceforth, status inquiries should be filed in duplicate and should identify by title and date the last paper known by the applicant to have been filed in the case. Each inquiry should be accompanied by a self-addressed, stamped envelope. Both the original inquiry and the duplicate will be marked with a response and the duplicate will be returned to the applicant. The original inquiry will be entered in the file only if the applicant has requested an estimated date for the next Office action; otherwise, the original inquiry will be placed in a separate file."

Dated: Sept. 14, 1971.

ROBERT GOTTSCHALK,
Acting Commissioner of Patents.

[FR Doc. 71–14129 Filed 9–23–71; 8:50 am]

Pub. in 36 F.R. 18961, Sept. 24, 1971

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,813,185, R. V. Smith, HEATING DEVICES; **2,956,143,** L. H. Schall, MICROWAVE OVENS; **3,182,164,** R. Ironfield, ELECTROMAGNETIC ENERGY SEAL, **filed** Jan. 9, 1970, D.C., N.D. Ill (Chicago), Doc. 70c52, *Raytheon Company* v. *Sanyo Denki, KK. et al.* Stipulation, cause dismissed with prejudice as to said defendant, Mar. 25, 1971.

2,856,229, R. Adell, PROTECTIVE TRIM MOLDING FOR VEHICLE DOOR EDGES; **2,887,338,** same, TRIM MOLDING FOR CURVED VEHICLE DOOR OUTER EDGES; **D. 172,414,** same, AUTOMOBILE, **filed** Aug. 22, 1967, D.C., E.D. Mich. (Detroit), Doc. 30272, *Adell Manufacturing Inc., and Franklin Z. and Marvin M. Adell* v. *Victra Sales Corp and Victra Corp.* Final judgment and injunction by consent, May 14, 1971.

2,887,338. (See 2,856,229.)

2,890,027, J. J. Fischer, LIQUIDS-SOLIDS BLENDING MACHINE, **filed** Oct. 23, 1969, D.C.N.J. (Newark), Doc. 1241–69, *The Patterson-Kelley Co., Inc.* v. *General Machine Company of New Jersey, Inc.* Consent judgment for permanent injunction, July 12, 1971.

2,908,831, G. Hirsch, SPIT DRIVE UNITS, **filed** July 13, 1971, D.C., S.D.N.Y., Doc. 71–C–3119, *Brevel Products Corp.* v. *Buddy L. Corporation.*

2,925,719, Robbins and Linn, REFRIGERATING PACKAGE, **filed** July 7, 1971, D.C., E.D. Mo. (St. Louis), Doc. N71C32, *Hospital Marketing Services Co., Inc.* v. *Kwik-Kold, Inc.*

2,931,383, H. E. Handley, CURB BOX HAVING LOCATING MAGNET THEREIN, **filed** July 28, 1971, D.C., E.D. Wis. (Milwaukee), Doc. 71–C–396, *Handley Industries, Inc.* v. *Ametek, Inc. and Revel L. Ivey.*

2,945,666, Freeman and Vaudreuil, BALL VALVE, **filed** June 29, 1971, U.S. Ct. of Cl., Doc. 520–71, *Jamesbury Corp.* v. *The United States of America.*

2,950,775, R. E. Zwayer, EXHAUST NOISE REDUCING AND AIR DIFFUSING MEANS FOR PNEUMATIC MOTORS, **filed** Feb. 12, 1971, D.C., N.D. Ill. (Chicago), Doc. 71c414, *The Aro Corp.* v. *Allied Witan Company and Norman Engineering Co.* Cause transferred to U.S.D.C. of Northern Dist. of Ohio.

2,956,143. (See 2,813,185.)

2,959,555, Martin and Abel, COPPER AND IRON CONTAINING SCALE REMOVAL FROM FERROUS METAL, **filed** Oct. 26, 1961, D.C., E.D. La. (New Orleans), Doc. CA 11665, *The Dow Chemical Company* v. *Chemical Cleaning, Inc. et al.* Judgment, plaintiff recover from defendants, July 29, 1969.

2,974,426, N. C. McDonald, METHOD AND APPARATUS FOR MAKING IDENTIFICATIONS, **filed** July 19, 1971, D.C. Conn. (New Haven), Doc. 14534, *Colt's Inc.* v. *Bangor Punta Operations, Inc.*

3,004,298, R. N. Haynie, METHOD FOR MAKING FLUID SEALS, **filed** May 20, 1969, D.C., N.D. Ill. (Chicago), Doc. 69c1062, *Federal-Mogul Corporation* v. *Chicago Rawhide Manufacturing Company.* Judgment order, plaintiff owner of patent. Judgment on counterclaim entered for plaintiff with prejudice, patent valid and infringed; defendant perpetually enjoined, June 17, 1971.

3,095,309, Zeblisky, McCormack, Williamson and Scheble, ELECTROLESS COPPER PLATING, **filed** Apr. 21, 1971, D.C., C.D. Calif. (Los Angeles), Doc. 71–971–EC, *Kollmorgen Corporation* v. *Dynachem Corporation.*

3,124,576. (See 3,197,466.)

3,129,927, A. D. Mast, MIXING APPARATUS FOR FLUENT MATERIAL, **filed** Apr. 14, 1971, D.C., E.D. Pa. (Philadelphia), Doc. 71–878, *Feedmobile, Inc.* v. *Jacob F. Conrad, doing business as Eastern Mobile Mills.*

3,161,223, W. G. Marsh, SHEET METAL BRAKE, **filed** Aug. 16, 1968, U.S. Ct. of App., 6th Cir., Ohio (Cincinnati), Doc. 20835, *Tapco Products Company* v. *Van Mark Products Corp. and Eugene Van Cleave.* In our opinion, claim 7 of the Marsh patent is valid and infringed by defendants. The judgment of the District Court is reversed and the cause is remanded for further proceedings consistent with this opinion, decided July 12, 1971.

3,173,911. (See 3,197,466.)

3,182,164. (See 2,813,185.)

3,197,466, Chow and Hoover, PENICILLIN SULFOXIDES AND PROCESS; **3,173,911,** J. R. E. Hoover, PROCESS FOR THE PREPARATION OF PENICILLIN ESTERS; **3,124,576,** R. Stedman, INTERMEDIATES FOR THE PREPARATION OF ANTIMICROBIAL AGENTS AND PROCESS FOR THEIR PREPARATION, **filed** June 14, 1971, D.C., E.D. Pa. (Philadelphia), Doc. CA–71–1452, *Eli Lilly and Company* v. *Smith Kline & French Laboratories.*

3,198,383, L. R. Brown, MARKING SPREADER, **filed** Oct. 23, 1968, D.C., E.D. Va. (Alexandria), Doc. 4987–A, *Laurence R. Brown* v. *Montgomery Ward & Co.* Judgment by consent, patent has been dedicated to the People of the United States on Mar. 10, 1971. Defendant has not infringed and complaint is dismissed with prejudice. Plaintiff permanently enjoined, Mar. 30, 1971.

3,262,378, L. K. Quick, LATENT HEAT REFRIGERATION DEFROSTING SYSTEM, **filed** Oct. 28, 1970, D.C. Del. (Wilmington), Doc. 4002, *Hussman Refrigerator Co. and Pet Incorporated* v. *Hilman Coal & Coke Company and Melchoir, Armstrong, Dessau, Inc.* Judgment on consent, patent valid and infringed, defendants enjoined, Apr. 19, 1971.

3,404,334, C. L. Marshall, COLOR TELEVISION TEST APPARATUS; **3,539,720,** same, PORTABLE TEST APPARATUS FOR COLOR TELEVISION; **D. 209,140,** same, PORTABLE KINESCOPE JUG FOR TESTING TELEVISION TUBES, **filed** Mar. 15, 1971, D.C., E.D.N.Y. (Brooklyn), Doc. 71–C–283, *Cecil L. Marshall* v. *Telematic-U.X.L. Corp.* Order of dismissal, May 5, 1971.

3,453,939, Pollitz and Fairchild, BITUMINOUS PAVER; **3,262,389,** Schrimper and Page, ADJUSTABLE STRIKE-OFF PLATE FOR FINISHING MACHINES, **filed** May 20, 1971, D.C., E.D. Ill. (East St. Louis), Doc. CV 71–86–D, *Iowa Man-*

ufacturing Company of Cedar Rapids, Iowa v. *Blaw-Knox Company.*

3,463,342, Bender, Fraser and Thompson, ADAPTER FOR CONTROLLED CLOSURE OF EVACUATED CONTAINERS; **3,474,543,** Bender and Thompson, METHOD AND APPARATUS FOR SIMULTANEOUSLY FREEZE DRYING A PLURALITY OF BACTERIAL CULTURES, **filed** Oct. 28, 1970, D.C., N.D. Ill. (Chicago), Doc. 70c2683, *Cenco Medical/Health Supply Corp.* v. *Thermovac Industries, Corp. et al.* Consent order, patents in suit are valid and infringed. Defendants are enjoined, Apr. 16, 1971.

3,474,543. (See 3,463,342.)

3,499,072, Helling and Erickson, METHOD FOR FORMING CYLINDRICAL SLEEVES FOR THERMOPLASTIC RESIN SHEETS; **3,560,287,** R. W. Helling, METHOD AND APPARATUS FOR PROTECTING INSULATED PIPE; **Reg. No. 852,025** (COVERITE), Coverite, Inc., **filed** May 19, 1971, D.C. Colo. (Denver), Doc. C-3129, *Coverite, Inc.* v. *Ceel-Tite, Inc. et al.*

3,506,169, J. H. Hales, DRAPERY PLEATING AND FOLDING APPARATUS, **filed** May 17, 1971, D.C., N.D. Calif. (San Francisco), Doc. C-71-947, *Perfect Pleat Products Company* v. *MBL Equipment Company.*

3,506,947, T. F. Leskosek, MOUNTING FOR ELECTRICAL TERMINAL BLOCKS AND SOCKETS AND THE LIKE, **filed** July 7, 1970, D.C., N.D. Ill. (Chicago), Doc. 70c1652, *Curtis Development & Mfg. Co.* v. *Reed Devices, Inc. et al.* Consent judgment, complaint dismissed with prejudice and counterclaim dismissed, each of the parties are enjoined, Feb. 4, 1971.

3,531,724, G. H. Fathauer, SIGNAL-SEEKING RADIO RECEIVER, **filed** Mar. 24, 1971, D.C., S.D. Ind. (Indianapolis), Doc. IP71-C-161, *Electra Corporation* v. *Regency Electronics, Inc.*

3,539,720. (See 3,404,334.)

3,560,287. (See 3, 499, 072.)

3,561,181, S. H. Bassett, REPLICA WOODEN BEAMS, **filed** May 10, 1971, D.C., E.D. Pa. (Philadelphia), Doc. 71-1100, *Paeco, Inc.* v. *Applied Moldings, Inc.*

D. 172,414. (See 2,856,229.)

D. 204,933, R. E. Richter, WHEEL, **filed** Mar. 31, 1971, D.C., C.D. Calif. (Los Angeles), Doc. 71-791-IH, *Cragar Industries, Inc.* v. *Pyramid Enterprises, Inc. et al.*

D. 209,140. (See 3,404,334.)

Reg. No. 852,025. (See 3,499,072.)

Certificates of Correction for the Week of Oct. 26, 1971

3,307,215	3,561,227	3,575,442	3,581,580
3,453,367	3,562,263	3,575,843	3,582,303
3,478,146	3,563,309	3,576,099	3,582,514
3,498,156	3,563,922	3,576,120	3,582,612
3,498,955	3,564,003	3,576,130	3,582,616
3,502,766	3,564,010	3,576,981	3,582,677
3,527,610	3,565,798	3,577,096	3,582,761
3,530,116	3,566,602	3,577,098	3,582,917
3,535,945	3,567,229	3,577,210	3,582,949
3,540,118	3,567,412	3,577,310	3,583,142
3,540,809	3,567,720	3,577,406	3,583,248
3,541,091	3,568,903	3,578,303	3,583,272
3,543,131	3,569,665	3,578,436	3,583,327
3,543,363	3,569,974	3,579,429	3,583,403
3,544,373	3,571,761	3,579,567	3,583,820
3,544,903	3,572,479	3,579,615	3,583,950
3,545,599	3,572,912	3,579,840	3,583,965
3,547,697	3,573,125	3,580,043	3,583,994
3,547,858	3,573,463	3,580,198	3,584,039
3,548,700	3,574,158	3,580,337	3,584,044
3,549,478	3,574,233	3,580,555	3,584,057
3,550,981	3,574,259	3,580,660	3,584,107
3,554,740	3,574,270	3,580,748	3,584,488
3,555,011	3,574,312	3,580,887	3,585,005
3,557,247	3,574,426	3,580,997	3,585,086
3,558,240	3,574,746	3,581,066	3,585,773
3,558,505	3,574,949	3,581,086	3,586,296
3,558,873	3,575,031	3,581,274	3,586,552
3,560,514	3,575,134	3,581,283	
3,561,975	3,575,334	3,581,451	

Disclaimers

3,431,050.—*Charles S. Jenkins,* Lexington, Ky. COMBINATION PAPER AND DEVELOPER SUPPLY. Patent dated Mar. 4, 1969. Disclaimer filed Apr. 23, 1971, by the assignee, *International Business Machines Corporation.*

Hereby enters this disclaimer to claims 1, 3 and 4 of said patent.

3,492,263.—*Roland E. Kreibich, Harlan G. Freeman,* and *Gene F. Baster,* Seattle, Wash., and *Karl F. Kumli,* Chico, Calif. METHOD OF PRODUCING A PHENOL-HCHO-RESORCINOL RESIN BY CONDENSING PHENOL AND HCHO IN THE PRESENCE OF A BIVALENT METAL ION AND THEN ADDING RESORCINOL AND A LIQUID HCHO HARDENER. Patent dated Jan. 27, 1970. Disclaimer filed July 29, 1971, by the assignee, *Weyerhaeuser Company.*

Hereby enters this disclaimer to claims 1 and 3 of said patent.

3,549,110.—*Robert B. Cotton,* Media, Pa. ENERGY ABSORBER. Patent dated Dec. 22, 1970. Disclaimer filed Aug. 18, 1971, by the assignee, *All American Engineering Company.*

Hereby enters this disclaimer to claims 1–6 of said patent.

3,563,178.—*Allen Scott Caples,* Baltimore, Md. MECHANICAL PRIMER. Patent dated Feb. 16, 1971. Disclaimer filed Aug. 2, 1971, by the assignee, *Catalyst Research Corporation.*

Hereby enters this disclaimer to claims 4 and 5 of said patent.

Disclaimer and Dedication

3,484,369.—*Gilbert Desire De Dobbeleer,* Leuven, Heverlee, Belgium. APPARATUS FOR HEMODIALYSIS OR ARTIFICIAL KIDNEY. Patent dated Dec. 16, 1969. Disclaimer and dedication filed Aug. 26, 1971, by the assignee, *Baxter Laboratories, Inc.*

Hereby disclaims and dedicates to the Public the remaining term of all claims of said patent.

PATENT EXAMINING CORPS

R. A. WAHL, Assistant Commissioner
F. H. BRONAUGH, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF OCTOBER 5, 1971

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—M. STERMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	6-01-70
GENERAL ORGANIC CHEMISTRY, GROUP 120—I. MARCUS, Director. Heterocyclic; Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	4-20-70
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—L. J. BERCOVITZ, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	8-14-70
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—A. P. KENT, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	10-07-70
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—W. B. KNIGHT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	5-04-70
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS AND RELATED ELEMENTS, GROUP 210—N. ANSHER, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Miscellaneous.	1-28-71
SECURITY, GROUP 220—R. L. CAMPBELL, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	4-10-70
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	10-02-70
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—W. L. CARLSON, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	9-21-70
PHYSICS, GROUP 280—R. L. EVANS, Director. Photography; Sound and Lighting; Indicators and Optics; Measuring and Testing; Geometrical Instruments.	8-03-70
DESIGNS, GROUP 290—R. L. CAMPBELL, Director. Industrial Arts; Household, Personal and Fine Arts.	10-02-70
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—A. BERLIN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Railways and Railway Equipment; Brakes; Rigid Flexible and Special Receptacles and Packages.	7-13-70
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders Woodworking; Tools; Cutlery; Jacks.	6-03-70
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—A. RUEGG, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	7-06-70
HEAT, POWER AND FLUID ENGINEERING, GROUP 340—C. F. GAREAU, Director. Power Plants; Combustion Engines; Fluid Motors; Pumps; Turbines; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Vaporizing; Temperature and Humidity Regulation; Machine Elements; Power Transmission; Fluid Handling; Lubrication; Joint Packing.	10-02-70
CONSTRUCTIONS, SUPPORTS, TEXTILES, CLEANING, GROUP 350—T. J. HICKEY, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Receptacles; Supports; Cabinet Structures; Centrifugal Separations; Cleaning; Coating; Pressing; Agitating; Foods; Textiles; Apparel and Shoes; Sewing Machines; Winding and Reeling.	8-10-70

Expiration of patents: The patents within the range of numbers indicated below expire during October 1971, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,690,560 to 2,692,986, inclusive
Plant Patents..... Numbers 1,312 to 1,327, inclusive

REISSUES

OCTOBER 26, 1971

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

27,200
STEEL SHELVING

Irwin J. Ferdinand, Glencoe, and Irwin R. Kulbersh, Morton Grove, Ill., assignors to Hirsh Company

Original No. 3,480,155, dated Nov. 25, 1969, Ser. No. 723,691, Apr. 24, 1968, which is a continuation-in-part of Ser. No. 691,545, Dec. 18, 1967. Application for reissue Jan. 19, 1970, Ser. No. 3,250
Int. Cl. A47f *5/00*
U.S. Cl. 211—148 24 Claims

Light weight steel shelving in which short sections of corner posts are snap assembled by the customer in end-to-end relationship and held in alignment and against separation by a connector with a molded pad cammed into place between the ends in weight bearing relationship. The connection accommodates various shaped posts and comprises an elongated generally U-shaped spring element bridging the joined ends and is provided with camming shouldered spring actuated detents which, upon insertion and advancement into the ends of post sections, spring inwardly of the walls of the post sections until the shouldered detents snap into shouldered apertures in the post walls in interlocking relationship therewith against rectilineal separation. A single post assembly can be disassembled individually either by slight relative rotation without damage to the posts but when assembled as a corner post in shelving is held against relative twisting and performs as an integral member or, tiered shelving can be separated as units by spring detents engaging in either of the two abutting post sections present at each corner of the shelving. Provision is also made with the connector for decor panels posts and nested leveling pads on the bottom of the posts for stabilizing the shelving.

27,201
APPARATUS AND PROCESS FOR PRODUCING AN EMBOSSED PLASTIC LAMINATE

Emanuel Mittman, Forest Hills, N.Y., assignor to W. R. Grace & Co., New York, N.Y.

Original No. 3,483,057, dated Dec. 9, 1969, Ser. No. 693,774, Dec. 27, 1967, which is a continuation-in-part of Ser. No. 354,797, Mar. 25, 1964. Application for reissue Apr. 23, 1970, Ser. No. 31,396
Int. Cl. B31f *1/10*
U.S. Cl. 156—209 15 Claims

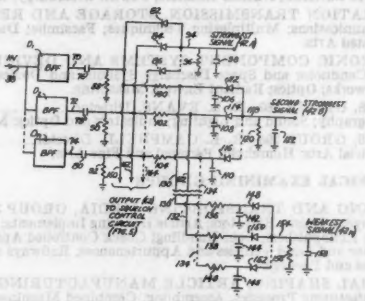
An apparatus and process for formng a uniform embossed laminate. A uniform pattern is applied to the plastic lamina of a laminate by utilizing a curvilinear crown on the roll to compensate for the deflection of the embossing and backup rolls. The laminating process includes the steps of embossing a uniform pattern into the outer surface of a film of thermoplastic polymeric material adhered

to a hard plate-like substrate by means of the embossing roll and a backup roll while the film is at an embossing temperature. After embossing, the film is rapidly cooled to set the embossed pattern.

27,202
SIGNAL SELECTION AND SQUELCH CONTROL IN WIDEBAND RADIO RECEIVERS

Leonard R. Kahn, Freeport, N.Y., assignor to Electrospace Corporation

Original No. 3,337,808, dated Aug. 22, 1967, Ser. No. 336,263, Jan. 7, 1964. Application for reissue July 22, 1969, Ser. No. 862,982
Int. Cl. H04b *1/10*; H04l *27/14*
U.S. Cl. 325—474 17 Claims



Improvement in communications receivers of the type having an intermediate frequency passband substantially wider than the bandwidth of the received signal, such improvement involving gating means comparing the energies in frequency related segments of the receiver passband, and passing as receiver output only such segments as have a different energy level (caused by signal presence) than the energy levels in other of the segments (caused by noise energy). Such gating means can also be employed for squelch control, with the receiver rendered sensitive when the energy levels in the passband segments are substantially different (i.e. signal energy is present) and squelched when the energy levels in the segments are substantially the same (i.e. only noise energy is present).

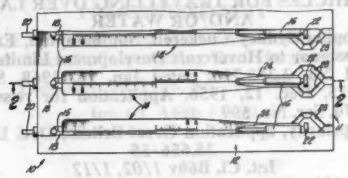
27,203
INEXPENSIVE CLINICAL THERMOMETER

Lee Le Beau, Venice, Calif., assignor to K & L Associates, Ltd., St. Clair Shores, Mich.

Original No. 3,350,490, dated Oct. 31, 1967, Ser. No. 426,721, Jan. 21, 1965. Application for reissue Oct. 29, 1969, Ser. No. 871,504

Int. Cl. B29b *5/04*; G01k *5/22*

U.S. Cl. 264—275 16 Claims



1. That method of making an inexpensive throw-away clinical thermometer which comprises supporting the opposite ends of a tensioned small diameter flexible core forming wire assembly of uniform diameter throughout the major portion thereof and having an enlargement near one end generally centrally of a mold cavity, closing the mold parts, charging said mold cavity with transparent thermoplastic material, opening the mold and separating said core assembly endwise from the molded part from the larger diameter end of said core assembly, charging said bore from end-to-end with colored liquid having a high coefficient of expansion, and sealing said bore.

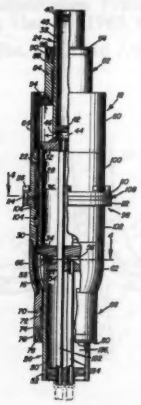
27,204
DIFFERENTIAL HYDRAULIC CYLINDER MECHANISM

Robert B. McCreery, P.O. Box 157, Xenia, Ohio 45385

Original No. 3,181,436, dated May 4, 1965, Ser. No. 165,761, Jan. 12, 1962. Application for reissue May 1, 1967, Ser. No. 641,060

Int. Cl. F01b *15/02*

U.S. Cl. 92—117 14 Claims



A stationary piston rod forming a load supporting column slidably and rotatably mounts a cylinder assembly to enclose fluid pressure chambers on opposite sides of a piston. Fluid under pressure is supplied to the pressure chambers through conduits extending through the piston rod in order to elevate or lower the cylinder assembly supporting a load.

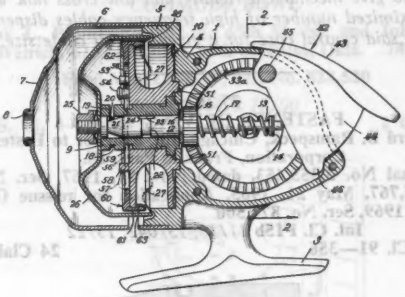
27,205
REMOVABLE LINE SHIELD FOR SPINNING REEL SPOOLS

Clifford E. Willis, Fayetteville, Ark., and Gerald D. Harrington, Kalamazoo, Mich., assignors to Shakespeare of Arkansas, Inc., Fayetteville, Ark.

Original No. 3,329,371, dated July 4, 1967, Ser. No. 349,568, Mar. 5, 1964. Application for reissue Dec. 9, 1968, Ser. No. 796,936

Int. Cl. A01k *89/04*

U.S. Cl. 242—84.2 R 12 Claims



A spinning reel comprises a housing, an axially movable shaft rotatably mounted in the housing, means for rotating the shaft, line pick-up means affixed to the shaft, means for providing forward axial movement of the shaft, a normally stationary line spool coaxially mounted on the shaft, and an annular spool flange detachably mounted on the periphery of the front wall of the spool. The annular spool flange comprises an axial wall positioned over the edge of the front wall of the spool and which extends rearwardly of the front wall. A line drawn axially from the spool rides on the flange when the line pick-up means is disengaged.

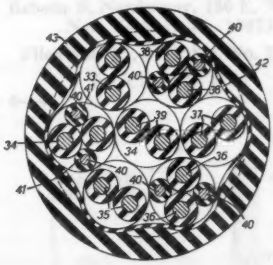
27,206
WIRED BROADCASTING SYSTEMS AND COMMUNICATION CABLES THEREFOR

Ralph P. Gabriel, Chobham, and Rupert I. Kinross, Shepperton, England, assignors to Communications Patents Limited

Original No. 3,350,647, dated Oct. 31, 1967, Ser. No. 317,608, Oct. 21, 1963. Application for reissue Oct. 22, 1969, Ser. No. 870,440

Int. Cl. H01b *11/08*; H04b *3/34*; H04n *7/10*

U.S. Cl. 325—308 6 Claims



A wired broadcasting system comprising transmitting means for transmitting a plurality of high frequency signals corresponding to different television picture programs and a plurality of audio frequency signals corresponding to different sound programs, a plurality of subscriber receiver means for receiving the television picture signals and the audio frequency signals transmitted by the transmitting means and a signal distributing network connecting said transmitting means with each of said subscriber receiver means for transmitting the signals transmitted by said transmitting means to each of said subscriber receiver

means, said signal distributing network including a signal transmitting cable comprising a central core element consisting of a region devoid of high frequency transmission conductors, a plurality of pairs of high frequency conductors being positioned around said central core in a manner whereby the outer surface of each of said pairs of high frequency conductors contacts the adjacent pair of high frequency conductors and the central core element and wherein the high frequency conductors are mechanically and electrically symmetrically placed about said central core to give mechanical rigidity and low cross talk with a maximized number of high frequency cables dispersed about said central core for a given overall cable size.

27,207

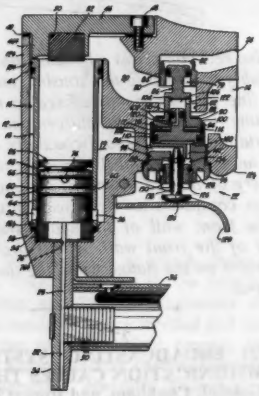
FASTENER DRIVING TOOL

Howard B. Ramspeck, Chicago, Ill., assignor to Fastener Corporation, Franklin Park, Ill.

Original No. 3,353,453, dated Nov. 21, 1967, Ser. No. 457,767, May 21, 1965. Application for reissue Oct. 31, 1969, Ser. No. 871,500

Int. Cl. F15b *11/15, 13/042, 15/22*

U.S. Cl. 91—356 **24 Claims**



A control valve on a pneumatic stapler is effective to drive the power piston mounted in the power cylinder through its drive stroke and automatically and sequentially through a return stroke whether or not the trigger has been released. This is accomplished by providing two valve members operatively interrelated with a delay mechanism or lost motion-dashpot connection therebetween to control the return of the piston upon completion of its drive stroke.

27,208

VEHICLES FOR TRAVELLING OVER LAND AND/OR WATER

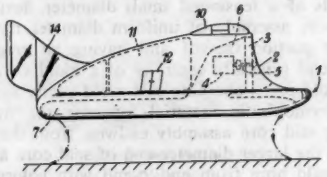
Christopher Sydney Cockerell, Southampton, England, assignor to Hovercraft Development Limited

Original No. 3,363,716, dated Jan. 16, 1968, Ser. No. 627,925, Dec. 12, 1956. Application for reissue Jan. 5, 1970, Ser. No. 599

Claims priority, application Great Britain, Dec. 12, 1955, 35,656/55

Int. Cl. B60v *1/02, 1/12*

U.S. Cl. 180—122 **32 Claims**



A vehicle capable of hovering or travelling over and in close proximity to a surface at a height which is small in relation to the size of the vehicle, and a method of supporting such a vehicle, wherein a curtain of moving fluid travels across the gap existing between said surface and the body of the vehicle and, in combination with the vehicle body and said surface, at least partially encloses a gas-containing space between the underside of the vehicle and said surface, a cushion of gas being produced in said space having a pressure sufficient, in relation to the area of the underside of the vehicle on which said pressure acts, to support the major part of the weight of the vehicle.

PATENTS

GRANTED OCTOBER 26, 1971

GENERAL AND MECHANICAL

3,614,788

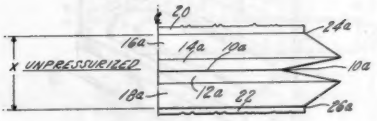
PRE-SHAPED BREAK POINT CONVOLUTE FOR A PRESSURIZED SUIT

Douglas E. Getchell, Windsor Locks, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Dec. 20, 1968, Ser. No. 785,603

Int. Cl. A62b *17/00*

U.S. Cl. 2—2.1 **1 Claim**



A two-convolute system includes a central root which has a much smaller natural diameter than the two outer roots, so that when the convolute is pressurized, it still maintains a well defined break point. Patterns for the convolute sections are disclosed.

3,614,789

TAILORING CUT FOR GARMENT SLEEVES, WITH ASSEMBLY OF THE CORRESPONDING ELEMENTS

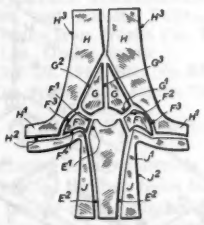
Georges Menut, Le Mazet-Saint-Voy (Haute-Loire), France

Filed Apr. 10, 1969, Ser. No. 814,965

Claims priority, application France, Apr. 16, 1968, 93/68; Mar. 24, 1969, 6907779

Int. Cl. A41d *1/00*

U.S. Cl. 2—93 **6 Claims**



A garment comprising a plurality of sections interconnected with one another includes sections which are specifically shaped to correspond to the contour of various muscles in the arm of the human body, so that when the arm is raised the garment portion at the waist does not ride upwardly.

3,614,790

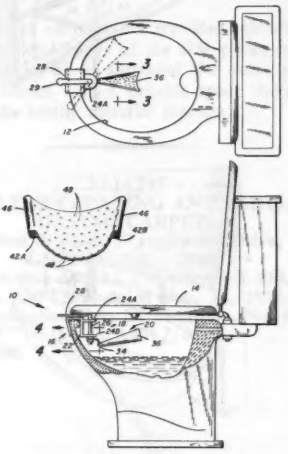
ANTI-NOISE APPARATUS FOR A COMMODE BOWL

Max L. Billingsly, 2807 E. 45th St. N., and John W. Weirick, 6132 S. Zunis, both of Tulsa, Okla. 74105

Filed May 28, 1969, Ser. No. 828,520

Int. Cl. A47k *17/00*

U.S. Cl. 4—1 **2 Claims**



In an attachment for a commode bowl, an arcuate channel receives urine and noiselessly conducts it into the basin of water located in the bottom of said commode bowl.

3,614,791

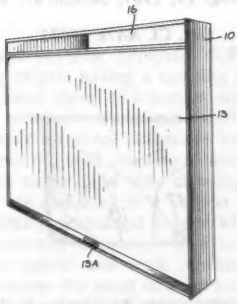
COLLAPSIBLE BATHTUB AND WASH-BASIN ASSEMBLY

Babette B. Newburger, 180 E. 79th St., New York, N.Y. 10021

Filed May 15, 1970, Ser. No. 37,719

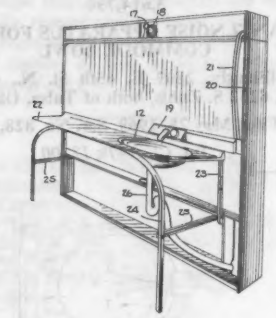
Int. Cl. A47k *4/00*

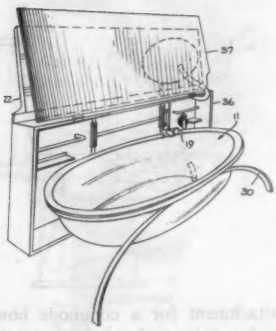
U.S. Cl. 4—4 **12 Claims**



A collapsible bathtub and wash-basin assembly which is retractable within a storage cabinet. The cabinet is pro-

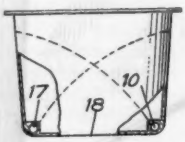
vided with a lower compartment occupied by the wash-basin, an intermediate compartment occupied by the bathtub, and an upper compartment housing a traveling water console. When either the wash-basin or the bathtub, both





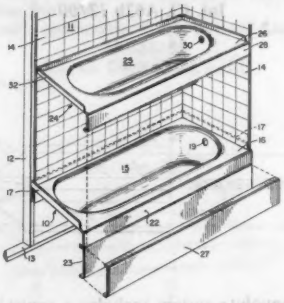
of which are formed of flexible plastic material, is withdrawn from its compartment and erected, the console, which rides on a vertical track, may be pulled down to supply water into the operative fixture.

3,614,792
BATHS
Stanley Leslie Sierant, Marlands, Cross Road, Keighley, England
Filed June 14, 1968, Ser. No. 737,172
Claims priority, application Great Britain, June 17, 1967, 28,022/67; Aug. 11, 1967, 36,958/67; Mar. 20, 1968, 13,416/68
Int. Cl. A47k *3/022*
U.S. Cl. 4—150 **4 Claims**



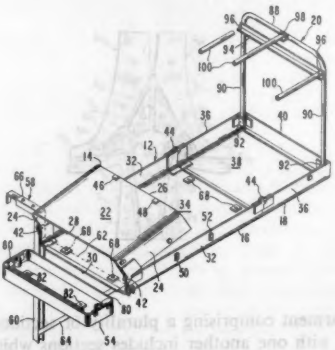
A bathtub having water introducing hollow perforated means extending along the lower part of the tub adjacent the intersection of the bottom and side walls of the tub, the hollow perforated means directing a plurality of jets of water upwardly and inwardly into the tub. A headrest is provided at one end of the tub adjacent the bottom thereof.

3,614,793
BATHTUB RENOVATING APPARATUS AND METHOD
Alfred Nemiroff, New York, N.Y., assignor to The P. I. Nemiroff Corporation, New York, N.Y.
Filed Sept. 4, 1968, Ser. No. 759,261
Int. Cl. A47k *3/00*
U.S. Cl. 4—173 **12 Claims**



The present invention includes a method and apparatus for renovating existing bathtubs. A bathtub liner assembly including tub and ledge portions is inserted into and supported by the existing bathtub, said liner assembly covering and obscuring the existing bathtub from sight. Waste and overflow connections are made between the liner assembly and an existing plumbing system to which the existing bathtub was previously connected.

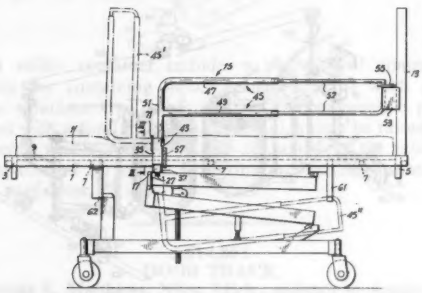
3,614,794
PORTABLE SLEEPER UNIT
Alfred H. Rodgers, 1051 E. Homestead Road, Sunnyvale, Calif. 94087
Filed Apr. 18, 1969, Ser. No. 817,318
Int. Cl. A47k *11/02*
U.S. Cl. 5—119 **12 Claims**



A portable sleeper unit adapted for use by campers and others wherein the unit is comprised of a collapsible body permitting the unit to be expanded to form a bed-like

support and to be collapsed to form a suitcase-like container. The unit can be coupled with brackets for mounting the same on the side of a vehicle or other support or can be used with support legs for positioning the unit above ground.

3,614,795
SAFETY SIDES FOR BEDS
Kenneth Malcolm Agnew, London, England, assignor to National Research Development Corporation, London, England
Filed Aug. 26, 1969, Ser. No. 853,011
Claims priority, application Great Britain, Aug. 29, 1968, 41,363/68
Int. Cl. A47c *21/00*; A47d *7/02*; A47f *5/00*
U.S. Cl. 5—331 **8 Claims**

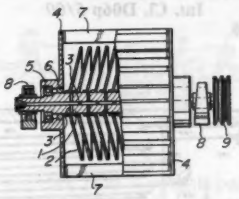


A safety side for a bed, including a clamp for engagement with a longitudinal member of the bed, an arm pivotally connected to the clamp, and a fence structure pivotally connected to the arm. The fence may pivot relative to the arm between a position in which it prevents a person falling out of bed and a position in which it extends generally perpendicular to the mattress so that it may constitute a hand-hold for a person on the bed as the bed is raised from a horizontal to a vertical position. The fence and arm may pivot relative to the clamp from the position in which the fence prevents a person falling out of bed to a position in which it is beneath the bed and out of the way for bed making. Safety sides are provided at both sides of a bed and the clamps of the two safety sides are rigidly interconnected.

3,614,796
METHOD AND APPARATUS FOR TREATING TEXTILE MATERIALS
Yoshiyuki Tanaka and Hiroshi Fujita, Kyoto, Japan, assignors to Tanaka Iron Works Co., Ltd., Kyoto, and C. Itoh & Co., Ltd., Osaka, Japan
Filed Oct. 20, 1969, Ser. No. 867,682
Claims priority, application Japan, Oct. 21, 1968, 43/76,091
Int. Cl. B05b *3/02*; B05c *8/04*
U.S. Cl. 8—151 **8 Claims**

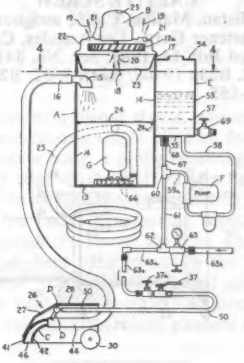
A method of treating textile materials with a liquid. A treating liquid is ejected through holes bored through the wall of a rotary hollow shaft, splashed by radial blades mounted on and rotating with the rotary hollow shaft under the influence of centrifugal force and divided into fine particles by conflict members which are arranged surrounding the outer peripheral edges of the blades and against which the splashing treating liquid impinges. The thus finely divided particles of the treating liquid hit and penetrate the textile material engaged around the outer edges of the conflict members, whereby the textile materials are treated with the liquid.

An apparatus for practicing the method of treating textile materials with a liquid. A large number of equally spaced radial blades are mounted on a rotary shaft having a number of holes bored through the wall thereof. A pair of opposed side plates are rotatably mounted on the opposite ends of the rotary hollow shaft and a large



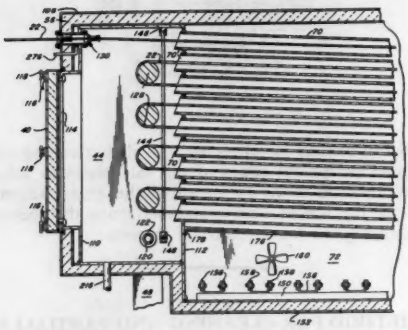
number of conflict members are provided extending across the outer peripheral edges of the side plates in suitably spaced relation so as to surround the outer peripheral edges of the blades with a suitable space therebetween, for carrying the textile material thereon.

3,614,797
METHOD FOR CLEANING AND PARTIALLY DRYING CARPETS
Judson O. Jones, 17 Inglewood Drive, Greenville, S.C. 29609
Original application Apr. 24, 1969, Ser. No. 818,876, now Patent No. 3,496,592, dated Feb. 24, 1970. Divided and this application Dec. 12, 1969, Ser. No. 889,813
Int. Cl. A47l *7/00*
U.S. Cl. 8—158 **1 Claim**



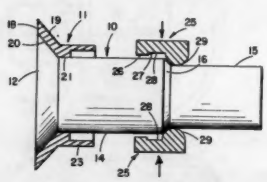
A unitary and portable apparatus for cleaning and partially drying carpets having a cleaning head including a sprayer positioned ahead of a suction nozzle for spraying a cleaning medium on a carpet closely adjacent the nozzle as the head is moved across the carpet. The suction nozzle draws the used cleaning solution and foreign matter from the carpet. The used cleaning solution and foreign matter are deposited in a suction tank provided with a high velocity centrifugal blower which evacutaes air therefrom, creating circulation of a large volume of air through the nozzle and tank. A centrifugal pump continuously removes the spent solution and foreign matter from the suction tank. A liquid cleaner is continuously injected in a pressurized source of hot water connected to the nozzles on the cleaning head for supplying a continuous flow of cleaning medium thereto.

3,614,798
SUPERATMOSPHERIC PRESSURED STEAM SETTING OF DYE ON WEB IN A TUBE
Jacob Serbin, Cedarbrook Hill Apt., Wyncote, Pa. 19095
Original application June 19, 1964, Ser. No. 380,740. Divided and this application May 28, 1968, Ser. No. 732,618
Int. Cl. D06p 5/00
U.S. Cl. 8—166 13 Claims



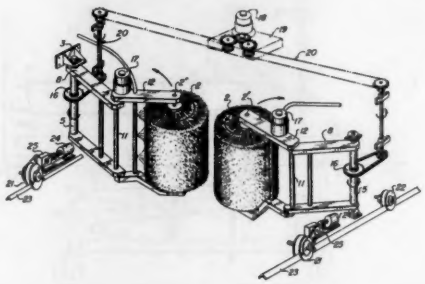
A method of setting dye on a dyed web of fabric comprising passing the web under tension through an atmosphere of live steam at superatmospheric pressure until said dye is set.

3,614,799
METHOD OF PRODUCING A SHEAR RESISTANT CAPTIVE SCREW
Bulent Gulistan, Malibu, Calif., assignor to Deutsch Fastener Corp., Los Angeles, Calif.
Filed July 14, 1969, Ser. No. 841,325
Int. Cl. B23p 19/08; B21h 3/02; B23g 9/00
U.S. Cl. 10—155 14 Claims



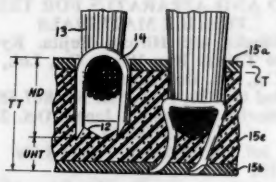
A captive screw including a sleeve having a bore substantially complementarily receiving a relatively large diameter portion of the shank of a screw inwardly of the screw head, with an annular enlargement on the shank, of greater diameter than the bore, being located at the end of this shank portion and retaining the screw to the sleeve. Beyond the annular enlargement, the shank is provided with an annular grove and rolled threads on its outer end. The sleeve includes a head at one end and an enlarged bore portion at the opposite end providing a relatively thin wall adapted to be bent outwardly to secure the sleeve to a workpiece. The fastener is produced by first providing a screw blank having a head and portions of two diameters, the larger diameter portion being extended through the sleeve, following which dies are engaged with the blank at the juncture of the smaller and larger diameter portions, producing an annular groove and displacing material outwardly into recesses in the dies where the annular enlargement is shaped. A bulge on the smaller diameter portion of the shank also is created when the groove is formed, which then is ground off, after which threads are rolled on the end portion of the shank.

3,614,800
CAR BODY WASHING APPARATUS
Shigeo Takeuchi, Nagoya, Japan, assignor to Takeuchi Tekko Kabushiki Kaisha, Nagoya, Japan
Filed Apr. 3, 1969, Ser. No. 813,077
Claims priority, application Japan, Feb. 26, 1969, 44/13,938
Int. Cl. B60s 3/06
U.S. Cl. 15—21 E 1 Claim



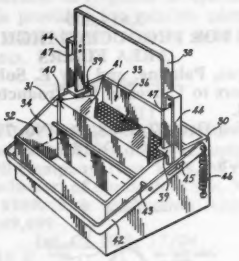
An apparatus for washing a car body comprising a movable or fixed frame on which a pair of vertically disposed rotatable brushes are mounted by means of support mechanisms which are foldable to move the brushes in the lateral directions so that the brushes can be used to wash the front and rear surfaces of the car body as well as the side surfaces thereof.

3,614,801
ROTARY TUBULAR BRUSH
Ralph C. Peabody, Minneapolis, Minn., assignor to Tennant Company
Filed Apr. 22, 1970, Ser. No. 30,685
Int. Cl. A46b 13/02
U.S. Cl. 15—179 15 Claims



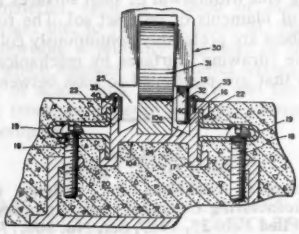
A tubular brush having a tube made of a foamed plastic material that has outer and inner skins of substantial thicknesses and a central foam layer, a plurality of tuft holes extending through the outer skin and at least substantially through the central layer and tufts secured in the holes by staples extending at least a substantial distance into the inner skin. The inner and outer skins are of the same material as the central layer, although the density thereof is substantially greater than that of the central layer. Also disclosed are tubular brushes having interlocking portions and brush tubes having split tubular sections joined together to form a tube.

3,614,802
UTILITY CONTAINER
George E. Seufert and Janet H. Seufert, both of 140 S. Depew, Lakewood, Colo. 80215
Filed Apr. 10, 1969, Ser. No. 815,031
Int. Cl. A47l *13/14, 13/58*
U.S. Cl. 15—260 3 Claims



A utility container includes a plurality of compartments for containing liquid agents, such as wash and rinse solutions. One or more of the compartments is provided with a foraminate platform which may be raised or lowered with respect to liquid contained in the related compartment for use in squeezing or pressing a sponge-like applicator, or tool.

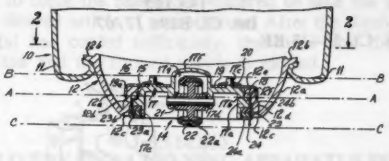
3,614,803
DOOR TRACK
Thomas E. Matthews, Niles, Mich., assignor to American Metal Climax, Inc., New York, N.Y.
Filed Apr. 7, 1969, Ser. No. 813,824
Int. Cl. A47h *33/00*
U.S. Cl. 16—94 4 Claims



A track is provided for a sliding wall panel and the like including a base member supporting a rail and having a flange defining a guide groove with the rail for receiving a guide extension of the panel. A hardened insert strip is provided along the inner surface of the flanges facing the respective rail to define a bearing surface for the guide projection.

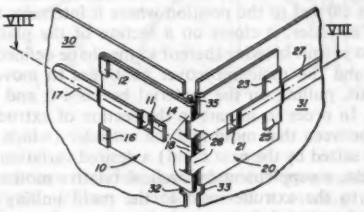
3,614,804
COMBINED SKID AND CASTER SUPPORTING MEANS FOR MOBILE HOUSEHOLD APPLIANCES
Karl Gustav Grellsson, Sollentuna, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden
Filed Sept. 11, 1968, Ser. No. 759,129
Claims priority, application Sweden, July 25, 1968, 10,116/68
Int. Cl. B60b *33/00*
U.S. Cl. 16—21 4 Claims

This invention relates to a movable household appliance, such as a suction cleaner, for example, the casing of which at its bottom has an exterior surface serving as a skid when the appliance is moved over a supporting surface like a deep pile rug, for example. A caster is employed to promote movement of the appliance over a supporting surface like a short pile rug or floor, for example. The caster has a horizontally disposed member and a wheel mounted thereon for rotation about a horizontal axis. The member in turn is journaled in the skid for rotation about a vertical axis perpendicular to the horizontal axis. Such journaling is effected by an annular bearing having cooperating races and antifriction elements, such as ball bearings, therebetween. The skid



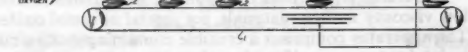
and rotatable member have a ring-shaped gap therebetween which is adjacent to the bearing and open at the bottom. In order to protect the bearing from dust and dirt ring-shaped packing is carried by the rotatable member. The packing is disposed in the gap for sealing the cooperating races and antifriction bearing elements therebetween.

3,614,805
HINGE FASTENER
Dealtry E. Barker, 1826 11th Ave. SW., Calgary, Alberta, Canada
Filed June 6, 1968, Ser. No. 735,035
Claims priority, application Canada, June 8, 1967, 992,541
Int. Cl. E05d *9/00*
U.S. Cl. 16—128 9 Claims



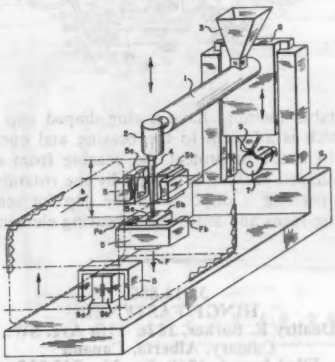
A hinge for use with planar sheets, wherein each hinge element is formed from a single piece of flat sheet material and comprises a body, a pintle receiving member disposed along one edge of the body, and a flexible permanently deformable locking tongue projecting from the opposite edge of the body. The locking tongue is adapted to be passed through the planar sheet on which the hinge is to be mounted, bent back to overly the body, passed through the planar sheet and an aligned aperture in the body and again bent back reversely to overly the body whereby to securely lock the hinge element to the planar sheet.

3,614,806
METHOD FOR SHUCKING SHELLFISH
Michael T. Henry, Roseland, N.J., assignor to Interchemical Corporation, New York, N.Y.
Filed Feb. 18, 1969, Ser. No. 800,194
Int. Cl. A22c *29/00*
U.S. Cl. 17—48 13 Claims



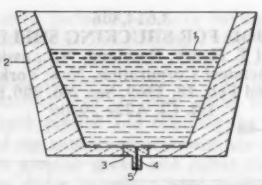
A method for shucking shellfish, particularly oysters, by exposing them to microwaves and oxy-acetylene heat for a period of time sufficient to open the shellfish and detach it from the shell.

3,614,807
APPARATUS FOR FORMING HOLLOW BODIES
Serge Lagoutte, Chalon-sur-Saone, France, assignor to Societe d'Etudes Verrieres Appliquees, Neuilly-sur-Seine, Hauts-de-Seine, France
Filed June 13, 1969, Ser. No. 832,916
Claims priority, application France, June 17, 1968, 155,192
Int. Cl. B29c *17/07*
U.S. Cl. 18—5 BE 1 Claim



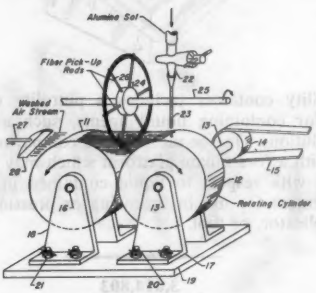
Hollow bodies such as bottles are blow molded from tubular plastic material produced along an axis defined in an extruder therfor by means of molds carried through a closed path, part of which coincides with that axis. As each mold is carried to the position where it intersects the axis of the extruder, it closes on a section of the plastic material to permit blowing thereof to the shape defined by the mold, and the mold moreover continues to move along that axis, pulling on the material between it and the extruder. In order to impart to the section of extruded material between that mold and the extruder (which section will be seized by the next mold) a desired variation in wall thickness, a supplementary cyclical relative motion is imparted to the extruder and to the mold pulling on the extruded material, for example by means of a cam which shifts the extruder along the extrusion axis with respect to the apparatus which carries the molds.

3,614,808
APPARATUS FOR SPINNING LOW VISCOSITY MATERIALS
Douglas P. Harrison, Durham, and Robert E. Cunningham, Raleigh, N.C., assignors to Monsanto Company, St. Louis, Mo.
Filed Nov. 6, 1968, Ser. No. 773,834
Int. Cl. D01d *5/00*
U.S. Cl. 18—8 SS 3 Claims



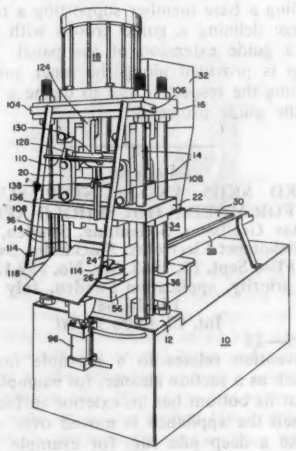
Apparatus is provided for spinning fine filaments from low viscosity molten materials, e.g., metal or metal oxides. The apparatus comprises a crucible containing molten material having an orifice therethrough and an elongated tubular extension positioned to extend from the orifice down away from the bottom of the crucible. The radius and length of the elongated member are dependent on the orifice radius, the melt density and surface tension of the molten material and on the extrusion velocity. The tubular extension serves to overcome the problem of wetting which otherwise results in the formation of drops of material. The use of the tubular extension results in free-jet extrusion of the low viscosity material.

3,614,809
MEANS FOR PRODUCING HIGH SURFACE AREA FIBERS
John C. Hayes, Palatine, and Jay E. Sobel, Des Plaines, Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.
Filed Dec. 27, 1968, Ser. No. 787,358
Int. Cl. D01d *1/00*
U.S. Cl. 18—8 4 Claims



Means for continuously producing small diameter fibers of an inorganic oxide material, such as alumina, by feeding a viscous sol of the material onto the surface of at least one of a set of "drawing" surfaces and then causing the meeting and withdrawal of such surfaces to effect the formation of filaments of semi-set sol. The resulting filaments of fibers are preferably continuously collected from between the "drawing" surfaces by mechanically moving rod means that are positioned to pass between such surfaces.

3,614,810
MOLDING PRESS
Jacob Schmier, Allentown, Pa., assignor to Rodale Manufacturing Company, Inc., Emmaus, Pa.
Filed Feb. 25, 1969, Ser. No. 806,776
Int. Cl. B30b *15/32*
U.S. Cl. 18—16 F 6 Claims



A molding press is provided with a stationary mold section and a movable mold section. The movable sec-

tion carries mechanism operative when the mold is opened for ejecting a workpiece from the mold. Additional mechanism is arranged for projection into the mold cavity for forming a recess in the side of the workpiece and for being withdrawn from the mold cavity in time to permit ejection of the workpiece from the mold cavity. Latch mechanism, operable in response to opening and closing of the mold, is provided for suitably controlling means which receives work ejected from the mold and discharges it from the press.

3,614,811

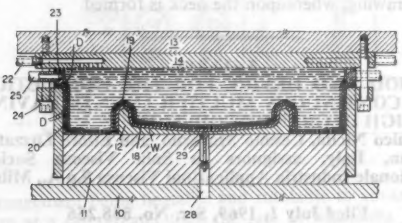
DIAPHRAGM-TYPE FORM-SHAPING APPARATUS

Herbert G. Johnson, Havertown, Pa., assignor to Shell Oil Company, New York, N.Y.

Continuation-in-part of application Ser. No. 815,127, Apr. 10, 1969. This application Aug. 13, 1969, Ser. No. 849,699

Int. Cl. B29c *17/04*

U.S. Cl. 18—19 F **6 Claims**



This application discloses diaphragm-type apparatus and method for form-shaping material, especially plastic sheet material in dies. The apparatus comprises elastomeric diaphragm means which is forced by pressure fluid against confined material, such as a sheet of plastic material against a rigid die, to form the material, the diaphragm means comprising a plurality of layers or laminae with the layer which engages the material having an opening through it to admit fluid between it and the material to separate it from the material after the forming operation has been completed.

3,614,812

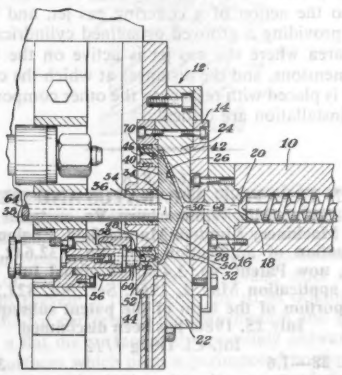
APPARATUS FOR MANUFACTURING HOLLOW THERMOPLASTIC ARTICLES

Ralph E. Ayres and Theodore P. Seda, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 14, 1968, Ser. No. 752,722

Int. Cl. B29f *1/00*

U.S. Cl. 18—30 RV **7 Claims**



A method and apparatus for making hollow thermoplastic articles, particularly small articles such as pharmaceutical capsules, pipe thread covers, unit-serve coffee cream containers, and the like. The method involves registering of a distributor and a die adjacent an extruder orifice wherein a given quantity of plasticized material meters through a feed slot of the distributor into a cavity of the die. A mold plug is then driven forward into the cavity to force the plasticized material to take the shape of the desired article of manufacture. After the plasticized material has cooled sufficiently, the mold and die are separated and the formed article is ejected.

3,614,813

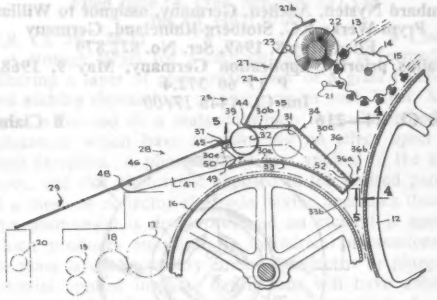
DELIVERY END CLEANING APPARATUS FOR CARDING MACHINES

Donald A. Sloan, Winston-Salem, N.C., assignor to The Bahnson Company, Winston-Salem, N.C.

Filed Aug. 28, 1969, Ser. No. 853,831

Int. Cl. D01g *15/76*

U.S. Cl. 19—107 **8 Claims**



A suction manifold assembly for pneumatic cleaning of the delivery end section of a carding machine, including a main plenum section forming a suction chamber above the doffer cylinder in open communication with the latter and with an adjacent portion of the main cylinder, and a hood-like extension of hinged plural sections overlying most of the other card components in the delivery end section. The main plenum section includes a first exhaust port in a side thereof connected to a suction riser and a return tube traversing the plenum section in parallelism with the axis of the first exhaust port communicating at one end with another suction riser and at its other end through an elbow with the plenum section to facilitate attainment of suction source conditions at each side of the plenum and maintain substantially uniform pressure across the plenum.

3,614,814

DEVICE FOR ACCOMMODATING SLIVERS INTO A SLIVER CAN

Hidejiro Araki, Aichi, and Ikuo Kodama, Toyota, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Aichi, Japan

Filed Oct. 24, 1969, Ser. No. 869,238

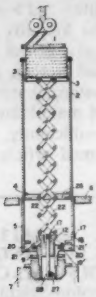
Claims priority, application Japan, Oct. 26, 1968, 43/78,184, 43/78,185; 44/23,299

Int. Cl. B65h *54/80*

U.S. Cl. 19—159 **6 Claims**

This invention relates to a device for accommodating slivers into a sliver can, in which the pressure onto the sliver coil in the can is maintained substantially constant. The sliver can is provided with a movable bottom plate, which bottom plate being supported by a controllable

pantagraph mechanism in a can wheel in a compact form at the time of change of the can, and when accommodating the sliver said bottom plate is adapted to be slowly lowered.

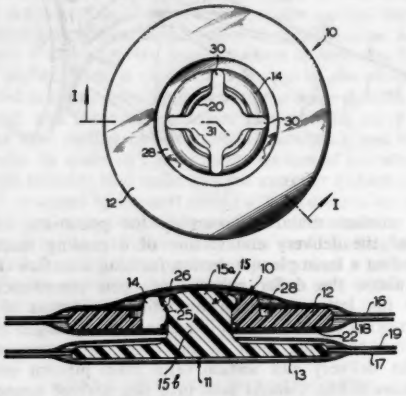


3,614,815

SNAP FASTENER

Bernhard Nysten, Aachen, Germany, assignor to William Prym-Werke KG, Stolberg-Rhineland, Germany

Filed May 8, 1969, Ser. No. 822,879
Claims priority, application Germany, May 9, 1968, P 17 60 372.4
Int. Cl. A44b *17/00*
U.S. Cl. 24—216 **8 Claims**



A female socket portion has a center aperture one axial side of which has an inlet. An opening is defined within the aperture by an inwardly projecting annular bead which has an axial endface directed toward the other axial side and closer to the same than to the inlet. The head of an undercut male coupling portion is insertable through the inlet and with a snap action through the opening; it has an annular contact face directed towards the inlet and engaging the axial endface of the bead.

3,614,816

METHOD OF MAKING CARTRIDGE CASES

Rolf Weyhmuller, Vaduz, Liechtenstein, Franz Xander, Gisingen, Austria, and Paul Greiner, Schaan, Liechtenstein, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG., Zurich, Switzerland

Filed July 7, 1969, Ser. No. 839,366
Claims priority, application Austria, July 12, 1968, A 6,782/68; Switzerland, July 16, 1968, 10,805/68, 10,807/68
Int. Cl. B21k *21/04*
U.S. Cl. 29—1.3 **6 Claims**

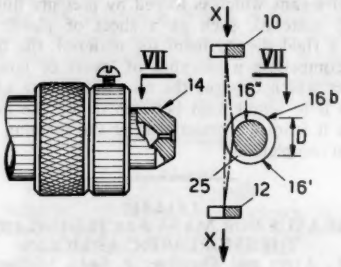
Steel cartridge cases are made from round bar stock preferably containing 0.16 to 0.25% C, which is cut transversely into blanks. The blanks are upset cold so that the degree of upsetting $\phi_s = \log_e(F_1/F_0)$ is about -0.5, F_1 and F_0 being cross sectional areas at right angles to the direction of compression. Upsetting is followed by heat treatment for 1–5 minutes at temperatures well above A_3 with very rapid heating and cooling. A cup is formed by extrusion of the blank, and drawn to the required depth. The bottom is preformed during upsetting and finished after drawing, whereupon the neck is formed.

3,614,817

METHOD AND DEVICE FOR THE PRODUCTION OF CONTINUOUS MULTIFILAMENTS HAVING A HIGH DEGREE OF COHESION

Domenico Nicita, Cesano Maderno, and Ettore Luzzatto, Milan, Italy, assignors to Snia Viscosa Società Nazionale Industria Applicazioni Viscosa S.p.A., Milan, Italy

Filed July 1, 1969, Ser. No. 838,256
Claims priority, application Italy, July 12, 1968, 18,927/68
Int. Cl. D02g *1/16*
U.S. Cl. 28—1.4 **10 Claims**



A method and a device are disclosed for improving the cohesion between individual monofilaments of a cohered yarn. The method consists in limiting the freedom of oscillatory movement of the individual filaments as exposed to the action of a cohering gas jet, and is carried out by providing a grooved or splined cylindrical surface in the area where the gas jet is active on the filaments. The dimensions, and the distances at which the cylindrical surface is placed with respect to the other component parts of the installation are critical.

3,614,818

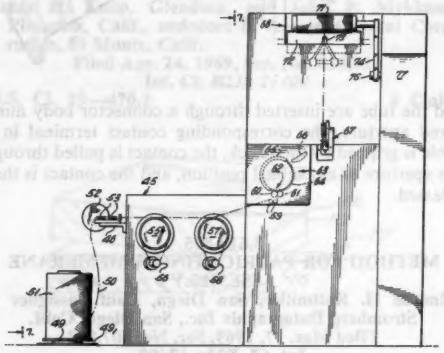
YARN TREATING APPARATUS AND METHOD

Fred B. Satterwhite, Williamsburg, Va., assignor to KMG Machinery Limited, Macclesfield, England

Continuation of application Ser. No. 532,642, Mar. 8, 1966, now Patent No. 3,454,998, dated July 15, 1969. This application May 2, 1969, Ser. No. 821,229
The portion of the term of the patent subsequent to July 15, 1986, has been disclaimed
Int. Cl. D02g *1/12*
U.S. Cl. 28—1.6 **30 Claims**

Apparatus for treating thermoplastic yarn comprising means for heating and drawing the yarn while advancing the yarn, means for crimping the yarn by longitudinal

compression directly after drawing while the yarn is still in a heated condition from the heating and drawing means, and means for winding up the drawn and crimped yarn, said heating and drawing means comprising a pair of roller arrangements, each of said roller arrangements having a peripheral surface with which the yarn is contacted, one of said roller arrangements being heatable and rotatable to heat the advance yarn from the supply to the other of said roller arrangements, said other roller



arrangement being heatable and rotatable to advance the yarn at a rate greater than the rate at which the yarn is advanced by the said one roller arrangement to thereby draw the yarn while in a heated condition from the said one roller arrangement, said crimping means comprising a chamber defining a yarn bunching zone for forming a plug of crimped yarn and means for driving the drawn yarn into the chamber while the yarn is still in a heated condition from the heating and drawing means.

3,614,819

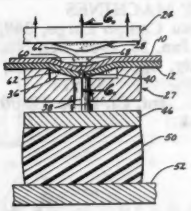
APPARATUS FOR BONDING FLAT SHEETS

Walter D. Behlen, Columbus, Nebr., assignor to Behlen Manufacturing Company

Original application Apr. 10, 1967, Ser. No. 629,505. Divided and this application Apr. 25, 1969, Ser. No. 819,139

Int. Cl. B23p *17/00*

U.S. Cl. 29—21.1 **3 Claims**



A mechanical splice for rolls of metal in continuous metal fabrication wherein each splice includes a portion deformed from adjacent sheets of metal thereby limiting relative movement therebetween. In one embodiment, the portion of material deformed is spread after it is deformed to prevent it from returning to its original condition. A die for performing the deformation and spreading includes a flat die surface with oppositely outwardly flaring end surfaces which press superimposed portions of the sheets of metal into a depression in a second die against a yieldable pin which spreads at least one of the portions by at least the time the movable die has bottomed out but after the one portion is deformed out of its sheet of material. The method of forming the mechanical spilcing involves the deforming of the elongated portion thereby forming an opening in the sheet of material and then the spreading of the deformed portion such that it cannot pass back into the opening. The spreading may begin at the same time as the deforming step begins but is not completed until the deforming step has been completely finished. A second embodiment of the splicing includes semi elliptical portions the miror image of each other on opposite sides of a perpendicular plane to the sheets of material being deformed on opposite sides of a parallel plane to the sheets of material to lock the sheets against relative movement. The dies for forming the semi elliptical deformations are the miror image of each other and have convex outer surfaces whereby they register with each other.

3,614,820

METHOD OF MANUFACTURING STORAGE TARGET FOR CATHODE RAY TUBE

Robert W. Morris, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed June 14, 1968, Ser. No. 737,115

Int. Cl. H01j *9/00*

U.S. Cl. 29—25.11 **9 Claims**

A storage target for a cathode ray tube is formed by adhering a layer of glass to the rear of a glass faceplate and etching depressions or apertures in such layer. Such layer is formed of a material which is easily etched by substances which have substantially no effect upon the glass faceplate. A photoresist is first applied to the glass layer, and this photoresist exposed to the desired pattern of a mesh or collector electrode having apertures therein. The photoresist is developed, and an etchant is applied which produces substantially cylindrical depressions in the glass layer. Secondary emissive dielectric or phosphor material applied in these depressions will have uniform depth and therefore uniform storage properties. A storage target according to the present invention may be provided with a collector on the glass layer between apertures therein, as well as with an undercollector between the glass layer and the faceplate.

3,614,821

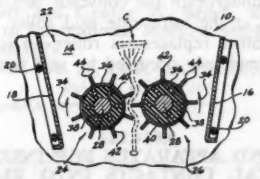
MEANS FOR CRUSHING OR COMPACTING DISPOSABLE OBJECTS AND REFUSE

Harold J. Qualheim, 641 Tower Circle, Racine, Wis. 53403

Original application Apr. 22, 1968, Ser. No. 722,898, now Patent No. 3,504,621, dated Apr. 7, 1970. Divided and this application Dec. 8, 1969, Ser. No. 883,159

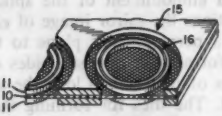
Int. Cl. B21f *27/00*

U.S. Cl. 29—121 **3 Claims**



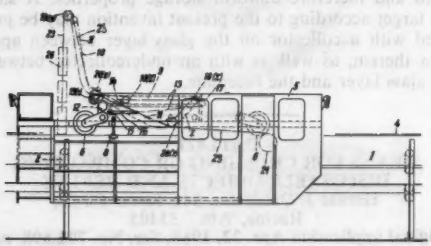
Rollers to be journalled in a frame and employed to compact, crush, or otherwise treat disposable material, such as metal containers, bottles, other frangible objects and refuse. The rollers are radially and circumferentially yieldable relative to their shafts and engage the objects as the latter pass between the rollers.

3,614,822
METHOD OF FORMING INTEGRAL MESH SUPPORTING FIXTURES
Silas A. Brown, Lake Elmo, Minn., assignor to Buckbee-Mears Company, St. Paul, Minn.
Filed Mar. 28, 1969, Ser. No. 811,548
Int. Cl. B23p *15/16*
U.S. Cl. 29—163.5 R 2 Claims



A process of electroforming and etching a material to produce an integral supporting fixture comprising the steps of electroforming a layer of depositant onto and into metal mesh, applying etchant resist to the depositant in the shape of the supporting fixture, etching away the excess depositant so as to leave only an integral supporting fixture, removing excess resist, cutting the supporting fixture from the remaining mesh, and crimping the integral supporting fixture so as to tighten the mesh supported therein.

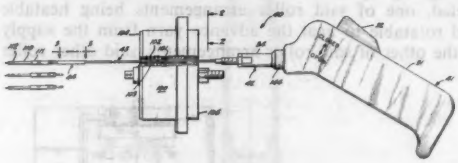
3,614,823
METHOD OF EXCHANGING GARLAND ROLLER SETS OF CONVEYOR INSTALLATIONS AND MEANS FOR CARRYING OUT SAME
Heinz Weber, Krefeld-Traar, and Hans Pelzer, Krefeld, Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany
Filed Apr. 11, 1969, Ser. No. 815,402
Claims priority, application Germany, Apr. 11, 1968, P 17 56 158.9
Int. Cl. B23p *19/00*
U.S. Cl. 29—200 A 7 Claims



A method of and cart for exchanging a garland roller set of a belt conveyor, according to which the cart is equipped with two laterally arranged hoisting means adapted in cooperation with each other to pull one roller set out from underneath the conveyor belt while simultaneously and at the same rate said roller set is being pulled out another replacement roller set is pulled into the position previously occupied by said first mentioned roller set.

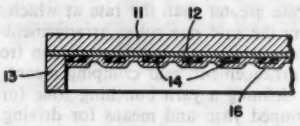
3,614,824
METHOD AND APPARATUS FOR INSERTION OF ELECTRICAL CONTACTS INTO ELECTRICAL CONNECTORS
Norbert L. Moulin, Placentia, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.
Filed Aug. 19, 1968, Ser. No. 753,377
Int. Cl. H01r *19/04*
U.S. Cl. 29—203 16 Claims

An electrical connector contact handling tool having a small diameter collet chuck mechanism to, in one embodiment, grip inside a contact socket tip, and in a second embodiment circumferentially grip a contact pin tip; a thin elongated tube aligned with the chuck; a wire reciprocatingly slidable in the tube; and a handle and trigger for selectively actuating the wire to slide to retracted and to extended position in the tube to accordingly effect contact holding or releasing. In the method, the small chuck



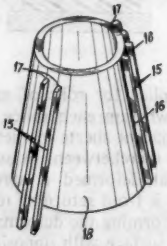
and the tube are inserted through a connector body numbered aperture, the corresponding contact terminal in a cable is gripped by the chuck, the contact is pulled through the aperture to assembled position, and the contact is then released.

3,614,825
METHOD FOR FABRICATING A MEMBRANE ASSEMBLY
Edmund H. Rottmiller, San Diego, Calif., assignor to Stromberg Datagraphix Inc., San Diego, Calif.
Filed Mar. 17, 1969, Ser. No. 807,862
Int. Cl. B23p *17/00*
U.S. Cl. 29—423 18 Claims



A method is described for fabricating a thin membrane supported at its periphery by a mounting frame, wherein the membrane is deposited on a substrate, the frame is secured to the membrane, and the substrate is subsequently etched away. Also described is a membrane assembly which may be constructed in accordance with the method of the invention.

3,614,826
METHOD FOR THE MANUFACTURE AND RECOVERY OF CONICAL AND DISCS SETS FOR WOODPULP MACHINES
Milton Pilao, Rua Campo Largo, 369, Sao Paulo, Brazil
Filed Jan. 25, 1968, Ser. No. 701,532
Claims priority, application Brazil, Nov. 23, 1967, 194,914
Int. Cl. B23p *19/00*
U.S. Cl. 29—434 12 Claims



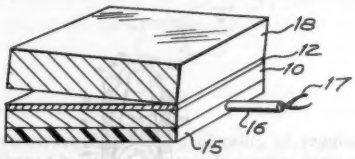
In making comminutor sets for pulp refining machines, stainless steel or carbon steel sheet material is compacted to a given thickness to increase its hardness and tensile

strength. Comminuting blades are made from the compacted material and welded to respective surfaces of the comminutor members of the set, employing a technique of ridgelessly welding in a skipping sequence to avoid raising the material temperature during welding above 200° C.

3,614,827
PROCESS FOR EXPLOSIVELY BONDING DISSIMILAR METALS

Louis H. Knop, Glendora, and John P. Mykkanen, Placentia, Calif., assignors to Aerojet-General Corporation, El Monte, Calif.

Filed Apr. 24, 1969, Ser. No. 818,910
Int. Cl. B23k *21/00*
U.S. Cl. 29—470.1 4 Claims

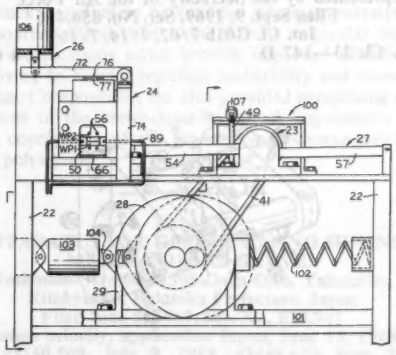


According to the present disclosure, a metal cladding layer of relatively low acoustic impedance is explosively bonded to one surface of the metal of two dissimilar metals which has the higher acoustic impedance. Subsequently, the metal cladding layer is explosively bonded to the other of the two dissimilar metals.

3,614,828
BONDING

Ramamurat R. Maurya, Peoria, Ill., and James J. Kauzlarich, Charlottesville, Va., assignors to Caterpillar Tractor Co., Peoria, Ill.

Original application Oct. 21, 1965, Ser. No. 499,249, now Patent No. 3,420,428. Divided and this application May 23, 1968, Ser. No. 740,403
Int. Cl. B23k *27/00*
U.S. Cl. 29—470.3 10 Claims

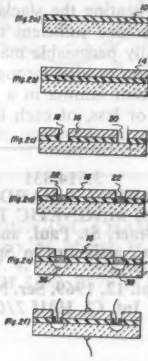


Metal parts are butt welded by reciprocatory motion. The axial load, oscillatory speed and time of engagement are controlled to produce a stabilized plastic condition and a uniform bond of high quality across the entire interface. The acceleration forces of the mechanism imparting the reciprocatory motion are dynamically balanced by moving balancing mechanism in opposition to the motion imparting mechanism.

3,614,829
METHOD OF FORMING HIGH STABILITY, SELF-REGISTERED FIELD EFFECT TRANSISTORS

James F. Burgess and Constantine A. Neugebauer, Schenectady, and Reuben E. Joynson, Scotia, N.Y., assignors to General Electric Company

Filed Dec. 8, 1969, Ser. No. 883,168
Int. Cl. B01j *17/00*; H01g *13/00*
U.S. Cl. 29—571 8 Claims

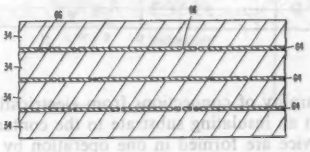


High stability, self-registered field effect transistors are formed by etching the metal gate electrode simultaneously with exposure of surface adjacent areas of a semiconductive wafer, growing an activator containing glass atop only the exposed areas of the wafer by passing a gaseous stream containing a mild oxidizing agent and an activator impurity across the etched face of the wafer heated to a temperature between 700° C. and 1000° C., and subsequently baking the semiconductive wafer in a reducing atmosphere at temperatures in excess of 1000° C. to form the source and drain regions of the semiconductive wafer. In a particularly preferred embodiment, a gaseous stream containing 5–10% hydrogen and 90–95% helium or argon is bubbled through water and ethyl borate solutions at room temperature whereupon the stream is passed over an etched wafer to form a silico-borate glass atop the exposed silicon surface. The semiconductive wafer then is baked for approximately 4 hours at 1000° C. in a nitrogen atmosphere containing 5–10% by volume hydrogen to drive the activator impurities into the wafer. A technique for forming complementary pairs of high stability self-registered field effect transistors on a single substrate also is disclosed.

3,614,830
METHOD OF MANUFACTURING LAMINATED STRUCTURES

Geoffrey Bate and George W. Brock, Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 28, 1969, Ser. No. 803,263
Int. Cl. H01f *7/06*
U.S. Cl. 29—603 11 Claims



A laminated structure, including lamina of metallic magnetically permeable material, constructed with each lamina separated from each next adjoining lamina by a

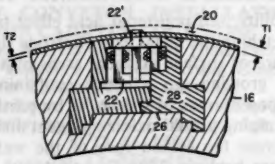
thin layer of electrically non-conductive material, with the exception that each lamina is joined and interconnected in a random pattern through the non-conductive layer to each adjacent lamina. The interconnections between each pair of laminae cover about 10%, or less, of each lamina's surface area. Laminated structures of this type are produced by providing a thin, electrically non-conductive coating upon the surface of metallic lamina, stacking a plurality of coated laminae, including magnetically permeable lamina, in registered contacting relationship, and then heating the stacked laminae at a temperature and for a time sufficient to simultaneously anneal the magnetically permeable material and cause each lamina to be diffusion bonded through the non-conductive layer to each adjacent lamina in a random pattern covering about 10%, or less, of each lamina's surface area.

3,614,831

METHOD OF MAKING A HARD-SURFACE ROTOR CONTAINING MAGNETIC TRANSDUCERS

Matthias J. Grundtner, St. Paul, and George E. Melink, Burnsville, Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Sept. 12, 1969, Ser. No. 857,389
Int. Cl. H01f *7/06*
U.S. Cl. 29—603 **5 Claims**



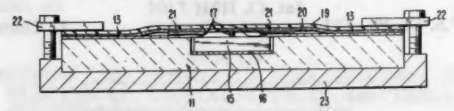
A hard-surface rotor in a rotating-head magnetic memory system for maintaining the uniform profile of flexible magnetic record members used in the magnetic memory system and for resisting damage to the rotor resulting from accidental contacting of the flexible magnetic record member with the rotor surface is described. A method for providing a hard-surface coating over an entire rotor peripheral surface, with only the magnetic transducer pole pieces exposed, is also described.

3,614,832

DECAL CONNECTORS AND METHODS OF FORMING DECAL CONNECTIONS TO SOLID STATE DEVICES

Dudley A. Chance, Samuel S. Im, John A. Perri, and Jacob Riseman, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 9, 1966, Ser. No. 533,073
Int. Cl. H05k *3/30*
U.S. Cl. 29—626 **10 Claims**



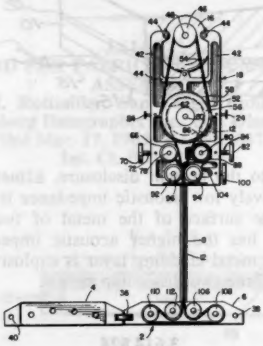
A plurality of connections from electrically conductive lands on an insulating substrate to the contacts of a solid state device are formed in one operation by fixedly positioning the device on, or in a cavity within, the substrate. A decal, including a backing plate with a plurality of conductive strips which can be adhered to the plate by means of a soluble adhesive, is positioned over the device bearing substrate with the strips in registry with respective contacts and lands. The strips are brought into contact with respective contact and land surface portions and subjected to heat and pressure sufficient to cause bonding therebetween. Thereafter, the decal backing plate may be removed from the strips, as by dissolving the adhesive, leaving the strips firmly bonded to the contacts and lands and bridging the space therebetween, whereby the lands are connected to the contacts through the strips.

3,614,833

PORTABLE MACHINE FOR CUTTING MATERIALS

John Roper, Baltimore, Md., assignor to Inventions Development Corporation, Baltimore, Md.

Filed June 9, 1970, Ser. No. 44,697
Int. Cl. B26b *27/00*
U.S. Cl. 30—139 **14 Claims**



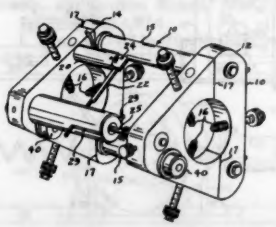
A portable band shear machine for cutting cloth, rugs, plastic and the like having an endless band blade with means for continuously sharpening same.

3,614,834

EXTENSOMETER FOR LARGE DIAMETER RODS

Randolph E. Holt and Robert A. Crist, Albuquerque, N. Mex., assignors to the United States of America as represented by the Secretary of the Air Force

Filed Sept. 9, 1969, Ser. No. 856,416
Int. Cl. G01b *7/02, 7/14, 7/16*
U.S. Cl. 33—147 D **4 Claims**



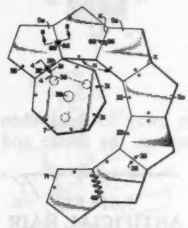
An extensometer having a pair of head members with circular openings therein for receiving reinforcing bar test specimens, each having three spring-loaded gage points for mounting the head members on the test specimen. A linear variable differential transformer is mounted in a housing on one of the head members and provides an output signal. The differential transformer is operated by a displacement shaft connected to the other head member through a 10:1 ratio arm.

3,614,835

EDUCATIONAL TOY CONSTRUCTION KIT

Macon D. Rice, Hawthorne, Nev. (707 Van Buren St. NW., Washington, D.C. 20012), and Emil G. Anderson, Washington, D.C.; said Anderson assignor to said Rice

Filed Sept. 2, 1969, Ser. No. 854,442
Int. Cl. G09b 23/04
U.S. Cl. 35—34 9 Claims



The construction kit has a plurality of regular polygonally shaped base and side panels ranging from triangles to dodecagons which panels have connecting means adjacent their edges so that certain combinations of panels may be placed edge to edge to produce either geometrically symmetrical flat plate structures or bowl shaped objects, and accordingly a group of side panels may be selectively and successively applied to a selected base panel to produce various shaped objects, and by selecting differentialy shaped base panels a large number of differently shaped objects can be obtained by employing relatively few panels.

3,614,836

BLOCK COPOLYMER FOXING AND SOLING COMPOSITION

John L. Snyder, Long Beach, Thomas L. Keelen, Palos Verdes Peninsula, and Geoffrey Holden, Los Alamitos, Calif., assignors to Shell Oil Company, New York, N.Y.

Filed July 8, 1968, Ser. No. 743,035
Int. Cl. C08d 9/08
U.S. Cl. 36—2.5 4 Claims

Improved compositions are provided especially for use as injection molded textile shoe foxing and soling comprising block copolymers having the structure polystyrene-polyisoprene-polystyrene with narrow molecular weight range specifications which provide improved adhesion of the foxing to canvas, injection moldability and ozone resistance. Compositions are also provided comprising combinations of the above-described block copolymers with block copolymers of the structure polystyrene-polybutadiene-polystyrene.

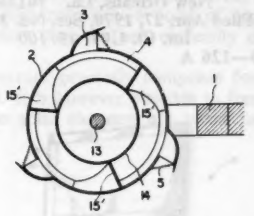
3,614,837

APPARATUS FOR DREDGING AND SIFTING MUD, SANDS OR GRAVEL

Toshinobu Araoka, 1308 Oaza-Orio, Yahata-ku, Kitakyushu, Fukuoka Prefecture, Japan

Filed June 5, 1969, Ser. No. 830,747
Claims priority, application Japan, June 13, 1968, 43/50,509; July 9, 1968, 43/48,623; Sept. 2, 1968, 43/63,539, 43/76,520
Int. Cl. E02f 3/92, 3/94
U.S. Cl. 37—57 1 Claim

A device for dredging up and sifting mud, sand and gravel, which device comprises a boom that can be dipped into water from aboard a ship or from the land, a scoop-carrying drum rotatably mounted on the end of the ladder, scoops on the periphery of the drum, a collecting space within the drum and partitioned from each scoop by means of a screen, and a suction pipe one end of which opens to the collecting space through one side of the



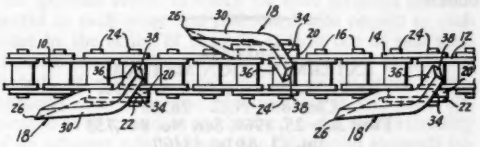
drum while its other end projects above the surface of the water.

3,614,838

TREE DIGGING CHAIN SAW

Bernard Wherry, St. Marys, W. Va. 26170

Filed Apr. 4, 1969, Ser. No. 813,498
Int. Cl. E02f 3/08; B27b 33/14, 33/02
U.S. Cl. 37—191 2 Claims



A conventional saw chain, for example, a link and roller chain, is provided with cutting teeth alternately arranged on opposite sides of the saw and provided with forwardly and outwardly angled teeth to cut downwardly through the ground to form a ditch around a tree or bush to facilitate the digging of the tree or bush with a substantial ball of earth thereon. Each tooth is provided with a rearwardly inwardly angled extension, with the paths of travel of alternate extensions overlapping each other so as to dig a ditch across the width of the chain as well as outwardly beyond the chain.

3,614,839

ID CARD LAMINAR STRUCTURES AND PROCESSES FOR MAKING SAME

James F. Thomas, Lawrence, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

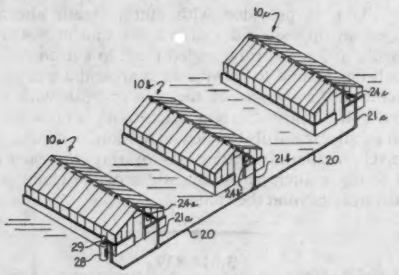
Filed Apr. 1, 1968, Ser. No. 717,710
Int. Cl. G09f 3/02; B32b 27/30
U.S. Cl. 40—2.2 19 Claims

Laminar structures comprising a color photograph bonded to a sheet of vinyl through an ethylene-vinyl acetate copolymer tie coat and identification (ID) cards including the same.

3,614,840
PORTABLE FOLDING THREE DIMENSIONAL SCENE
Herbert S. Vadell, 4017 McFarland St., New Orleans, La. 70126
Filed Apr. 27, 1970, Ser. No. 32,245
Int. Cl. G09f *19/100*
U.S. Cl. 40—126 A 2 Claims

A portable scene of three dimensional objects, foldable to form its own container without dismantling the objects.

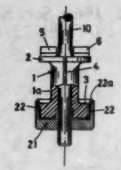
3,614,841
EXTERMINATION METHOD
Grady W. Query, P.O. Box 12452, Charlotte, N.C. 28205
Filed July 25, 1969, Ser. No. 844,753
Int. Cl. A01m *13/00*
U.S. Cl. 43—124 4 Claims



A method of exterminating insects within a building wherein a predetermined weight of insecticide is dispersed through a permanently installed distribution system at predetermined periodic intervals in order to insure continuing extermination of insects without exposure of materials stored within the building to excessively high concentrations of the insecticide.

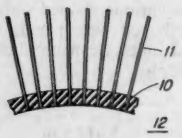
3,614,842
COMPRESSING ARRANGEMENT IN TOY ASSEMBLY KIT
Artur Fischer, 133 Grunmettarstrasse, 7241 Tumlingen, Germany
Original application Sept. 19, 1966, Ser. No. 580,240, now Patent No. 3,464,147. Divided and this application Apr. 24, 1969, Ser. No. 819,051
The portion of the term of the patent subsequent to Sept. 2, 1986, has been disclaimed
Int. Cl. A63h *33/04*
U.S. Cl. 46—23 10 Claims

A pulley has a flange and is provided with an axial slot extending through the flange. A compressing member is cup-shaped and has a smaller-diameter bore registering with that of the pulley, and a larger-diameter bore constituting a continuation of the smaller-diameter bore from



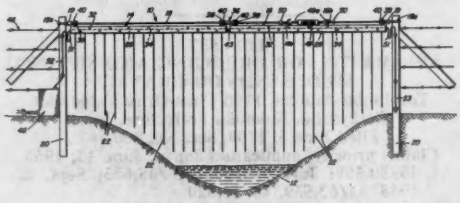
which it converges away so that, when pushed over the flange, it will compress the flange and narrow the slot.

3,614,843
ARTIFICIAL HAIR
Selwyn G. Hawtin, Whitley, Coventry, and Harold G. Mallaban, Napton, near Rugby, England, assignors to Courtaulds, Limited, London, England
Filed Oct. 31, 1968, Ser. No. 772,361
Claims priority, application Great Britain, Nov. 1, 1967, 49,565/67
Int. Cl. A63h *3/44*
U.S. Cl. 46—172 7 Claims



An artificial hair piece comprising a plurality of filaments of synthetic or regenerated polymeric material, for example cellulose triacetate, the filaments having a hollow interior by virtue of having a cross-section which is a ring or an open or closed split-ring.

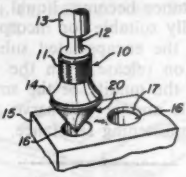
3,614,844
FLOOD GATE STRUCTURE
Emery H. Withers, Road 2, Cynthiana, Ky. 41031
Filed Apr. 21, 1970, Ser. No. 30,570
Int. Cl. E06b *11/02*
U.S. Cl. 49—10 10 Claims



A flood gate structure for an electric fence comprises an assembly having a plurality of rod members disposed in side-by-side, laterally spaced relationship. The assembly is mounted on a cable extending across a ground identation and is swingable about the cable to move upwardly out of the way of flood waters and debris carried

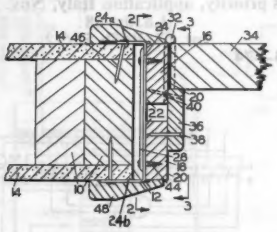
thereby. The assembly normally hangs from the cable with the rod members providing an electric barrier for the indentation.

3,614,845
ABRADING IMPLEMENT
Herbert E. Cook, 98 W. Floyd Ave., Dayton, Ohio 45415
Filed July 18, 1969, Ser. No. 842,997
Int. Cl. B24d *17/00*
U.S. Cl. 51—358 **9 Claims**



An abrasive cone assembly comprising a mandrel and an expendable cone tip. The rotary driving connection between the elements includes complementary projecting and recessed portion allowing a closed coupled connection therebetween, and features a projecting pin on the mandrel providing elongated central bearing support in the cone.

3,614,846
DOOR JAMB ASSEMBLY
Robert L. Donnelly, 1100 NE. 152nd, Portland, Oreg. 97230; Richard A. McGrath, 29126 Wellington, Farmington, Mich. 48024; and Cray J. Coppins, 2732 E. Overlook Road, Cleveland, Ohio 44106
Filed Feb. 13, 1967, Ser. No. 620,583
Int. Cl. E06b *1/08, 1/60*
U.S. Cl. 52—213 **1 Claim**

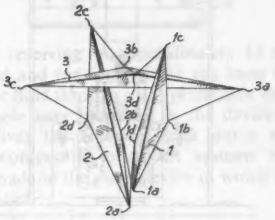


A door jamb assembly made of multiple parts so as to be shipped and stored in knocked-down condition. A strap member is included as one of the parts and is designed to assist in securing the jamb to a support as well as to adjust the width of the jamb for fitting walls of different thickness.

3,614,847
ARCHITECTURAL STRUCTURE AND WORKS UTILIZING THE SAID STRUCTURE
Pierre Debeaux, 2 Boulevard d'Arcole, Toulouse, Haute-Garonne, France
Filed Dec. 17, 1968, Ser. No. 785,454
Claims priority, application France, Dec. 18, 1967, 132,671; Aug. 1, 1968, 161,543
Int. Cl. E04h *12/08*
U.S. Cl. 52—648 **1 Claim**

An architectural structure which, in its simplest form, is a cell composed of at least three solid oblong elements connected to each other and positioned with respect to each other, without mutual contact, by the action of a system of tie-rods, the number of which does not exceed twice the number of solid elements considered, and which connect at least one intermediate point of each of said elements to a point close to one extremity of another solid element.

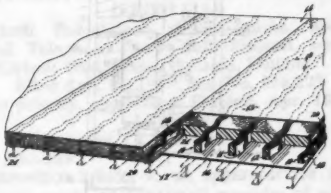
The above structure generally comprises four tie-rods per solid element. It is however possible to form a structure in which the solid elements are connected to each other.



An architectural structure in accordance with the structure specified above, in which the solid elements are connected to each other and positioned with respect to each other by the action of tie-rods, at least one of said solid elements being connected to an adjacent solid element by tie-rods of which at least one has issued from a substantially central or intermediate point of said solid element so as to terminate and be fixed to the other extremity of an adjacent solid element, the other solid elements being connected to each other by four tie-rods coupling a point close to one of the extremities of a solid element to an intermediate or substantially central point of another solid element.

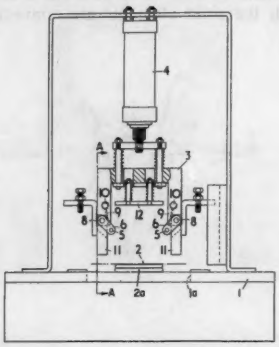
Finally, these structures are applicable to constructional and building works and even to spatial relays.

3,614,848
FOAM STRUCTURAL ELEMENT
Robert A. Hitch, Cincinnati, Ohio, assignor to Pullman Incorporated, Chicago, Ill.
Original application June 9, 1964, Ser. No. 373,694, now Patent No. 3,472,728, dated Oct. 14, 1969. Divided and this application May 8, 1969, Ser. No. 840,577
Int. Cl. B32b *3/12, 5/18, 27/40*
U.S. Cl. 52—747 **4 Claims**



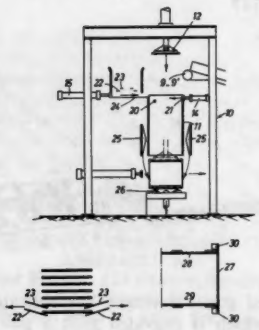
An insulated panel having a prefabricated sandwich construction which is provided with a pair of parallel sheets separated from one another by a plurality of spaced apart spacers having foamable material between the spacers and the sheets wherein each of the spacers is defined by a pair of parallel strips defining a second space filled with such foamable material having the columnar growth or rise axis of the foamable material being in a direction perpendicular to the length of the strips and parallel to the plane of said strips.

3,614,849
PACKAGING MACHINES
Anthony Harry Croucher, Homewood, 12 Pine Bank, Tower Road, Hindhead, England
Filed Aug. 18, 1969, Ser. No. 850,902
Int. Cl. B65b *13/02, 13/20;* B65c *1/04*
U.S. Cl. 53—3 5 Claims



Deformable articles, e.g. textile articles, are packed by laying a length of adhesive or part-adhesive tape across the articles, blowing the ends of the tape around the edges of the articles by means of compressed gas jets and compressing the articles and tape between upper and lower pressure plates so as to adhere the tape either to the articles or to itself.

3,614,850
METHOD FOR PACKAGING LOOSE FIBROUS MATERIAL FROM A CONTINUOUS FLOW
Claude Brochot, Antony, France, assignor to Service d'Exploitation Industrielle des Tabacs et des Allumettes, Paris, France
Continuation-in-part of application Ser. No. 476,070, July 30, 1965. This application July 18, 1968, Ser. No. 745,878
Claims priority, application France, Aug. 3, 1964, 984,032
Int. Cl. B65b *1/24, 25/02, 43/08*
U.S. Cl. 53—24 1 Claim



Process for packaging of loose fibrous material, such as tobacco, from a continuous flow, in portions subjected to successive compressions in a pressing device. The pressing device has a pressing cylinder which is open on both ends, with removable side walls. Provision is made for placing a bottom plate and a top plate on the packaged material.

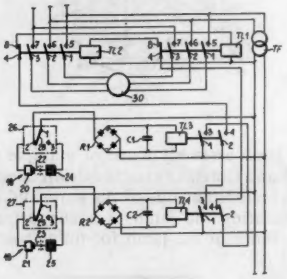
3,614,851
METHOD OF ENCAPSULATING LIQUID
Sydney James Green, London, England, assignor to Brown and Williamson Tobacco Corporation, Louisville, Ky.
No Drawing. Filed Apr. 16, 1969, Ser. No. 816,841
Claims priority, application Great Britain, Apr. 19, 1968, 18,560/68
Int. Cl. B65b *63/08*
U.S. Cl. 53—25 5 Claims

The invention provides a method of encapsulating a liquid substance, in which a tube is filled with the substance, is subjected to freezing to solidify the substance, and is cut into lengths whose ends are then sealed, the tube lengths being finally allowed to warm so that the encapsulated substance becomes liquid. Capsules so produced are especially suitable for incorporation in smoking articles. Thus the encapsulated substance may be a substance which, on release from the capsule, will improve or enhance the quality of the smoke provided by the smoking article and/or will serve as a smoke-filtering and/or filter-moistening substance.

3,614,852
SHRINK PACKAGING
Konrad Buob, Rho, Milan, Italy, assignor to W. R. Grace & Co., New York, N.Y.
No Drawing. Filed May 9, 1967, Ser. No. 637,068
Claims priority, application Great Britain, May 11, 1966, 20,975/66
Int. Cl. B32b *27/30;* B65b *43/00*
U.S. Cl. 53—30 4 Claims

The invention relates to the use in shrink packaging of a moderately oriented film of a vinyl chloride polymer which has a shrinkage of at most 35% at 100° C. in both directions and a shrink tension less than 10.5 kg./cm.^{2}.

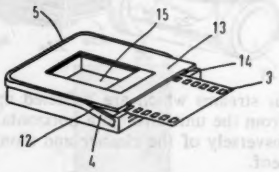
3,614,853
DEVICE FOR FEEDING ARTICLES TO PAPER WRAPPING MACHINES
Ariosto Seragnoli, Bologna, Italy, assignor to GD Societa in Accomandita Semplice di Enzo Seragnoli e Ariosto Seragnoli, Via Pomponia, Bologna, Italy
Filed Nov. 21, 1969, Ser. No. 878,673
Claims priority, application Italy, Nov. 28, 1968, 1,830a/68
Int. Cl. B65b *57/12*
U.S. Cl. 53—74 3 Claims



An irregular supply of articles such as candies is fed by a lower speed conveyor to a higher speed conveyor where they pile up against a fixed stop. Articles against the stop are transferred to a wrapping machine at a normal operating rate or at a higher rate. Two photo-electric sensing mechanisms are placed along the higher speed conveyor so that when the pile of articles does not reach the nearest sensing mechanism the wrapping machine and transfer of articles thereto is stopped; when the pile of articles reaches only the nearest sensing mechanism the

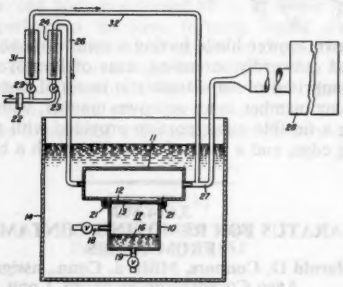
wrapping machine operates at normal rate; and when the pile of articles reaches the further sensing mechanism the wrapping mechanism operates at the higher rate.

3,614,854
APPARATUS FOR EXPANDING A TRANSPARENCY INSERTION SLIT IN A SLIDE FRAME
Peter Hans Ernst Mundt, Garmisch-Partenkirchen, Otfried Urban. Kochel am See, and Arnold Neuhold, Garmisch-Partenkirchen, Germany, assignors to Geimuplast Peter Mundt KG, Farchant, Germany
Filed Oct. 2, 1968, Ser. No. 764,469
Claims priority, application Germany, Oct. 4, 1967, G 38,057; Jan. 11, 1968, P 16 22 116.2
Int. Cl. B65b *17/00, 63/00*
U.S. Cl. 53—381 R 4 Claims



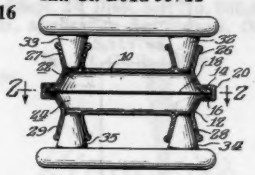
A slide frame having at least one expansible insertion slit is gripped at its edge portion that is adjacent to the insertion slit and at at least one other portion. At least one portion of the frame is simultaneously or subsequently subjected to a deformation by which the frame portions defining the insertion slit are spaced apart so that the insertion slit is expanded.

3,614,855
CONTINUOUS PRODUCTION OF CALIBRATION GAS FLOWS
Frank W. Van Luik, Jr., Schenectady, N.Y., assignor to General Electric Company
Filed Dec. 26, 1967, Ser. No. 693,471
Int. Cl. B01d *59/12*
U.S. Cl. 55—16 2 Claims



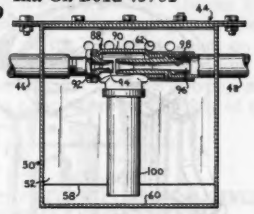
The continuous production of very low predeterminable concentrations of gases in the range from about 10^{-9} to 10^{-13} gm./cc. is described. The properties of nonporous permeable membranes are employed to controllably provide preselected very low concentrations of some given gas in a chamber having the selectively permeable membrane as at least part of the wall area thereof. In essence the membrane is employed as a flow control valve for the molecular specie of interest. A measured flow of dilution gas is mixed with the predetermined amount of the given gas, which has passed through the membrane wall area creating a mixed flow having a still lower concentration in the given gas. This flow, which is relatively large, is conducted to trace gas measuring equipment for the calibration thereof with respect to detection of the given gas.

3,614,856
GAS TRANSFER DEVICE
Manuel C. Sanz, Lancy, Switzerland, and John J. J. Staunton, Oak Park, Ill., assignors to The Perkin-Elmer Corporation
Filed Nov. 29, 1968, Ser. No. 779,766
Int. Cl. B01d *53/22*
U.S. Cl. 55—16 11 Claims



A device for receiving an approximately 15 microliter sample of blood and for transferring gas from the blood to a gas receptor fluid through a gas permeable membrane. The blood sample may be stored in the device which is adapted to deliver the receptor fluid into a measuring electrode. By contrast in prior art systems blood gas analyses were made in the same device in which the blood sample was placed.

3,614,857
AUTOMATIC LIQUID EJECTION TRAP
George D. Fette, 3010 McGee St., Apt. 1, Kansas City, Mo. 64108
Filed Dec. 29, 1969, Ser. No. 888,310
Int. Cl. B01d *45/02*
U.S. Cl. 55—219 7 Claims

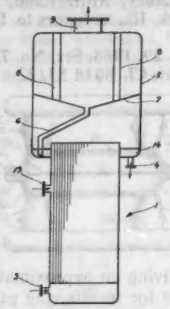


A trap comprising a closed vessel communicating through a conduit with a pressurized gas system. A pressurized gas flow suction device in the conduit permits gravitation of liquid and solid contaminants into the vessel and a float controlled solenoid valve on the discharge opens to create a flow of pressurized gas through the device when the contaminants reach a predetermined level in the vessel. This flow sucks the contaminants through the device for discharge in the gas stream to empty the vessel.

3,614,858
APPARATUS FOR SEPARATING LIQUID FROM GAS
Eino Eemil Pohjolainen, Vuoksenniska, and Martti Aukusti Tolvanen, Paaskylahti, Finland, assignors to Enso-Gutzeit Osakeyhtio, Helsinki, Finland
Filed Apr. 15, 1969, Ser. No. 816,223
Claims priority, application Finland, Apr. 18, 1968, 1,080/68
Int. Cl. B01d *45/12*
U.S. Cl. 55—269 8 Claims

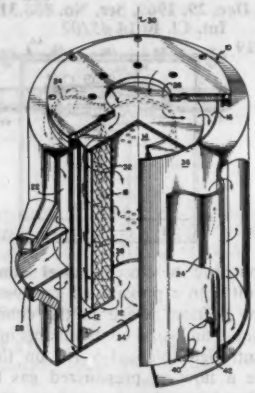
This invention relates to an apparatus for separating liquid which might contain small particles of solid material from gas, the apparatus being mounted at the upper portion of a vertical heat exchanger and comprising a false bottom, at least one spiral wall and separate discharge connections for the separated liquid and for the purified gas. The mixture of gas and liquid in a quiet upwardly directed flow in a passage situated between a vertical spiral wall and the enveloping wal of the apparatus is converted into a spiral-formed horizontal flow, which is then throttled in a discharge opening formed between two spiral walls thus increasing the flow velocity to a

value sufficient for centrifugal separation of the liquid from the gas. The free space between the spiral wall or



walls is directly above the tube or lamella heat exchanger and is sufficiently large to permit tube or lamella replacement through said space.

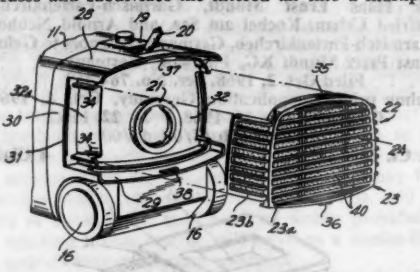
3,614,859
GAS FILTER-SILENCER
Billy L. Clark, Corning, N.Y., assignor to Ingersoll-Rand Company, New York, N.Y.
Filed Nov. 17, 1969, Ser. No. 877,286
Int. Cl. B01d *27/08*
U.S. Cl. 55—276 **4 Claims**



A gas filter-silencer of limited size with a plurality of concentric chambers having an interpositioned annular filter. The chambers of one pair thereof are in gas flow communication by way of choke tubes which are structurally and operatively disposed therebetween. The choke tubes divide the filtered gas into parallel paths, each of which extend more than half the axial length of the filter-silencer, to suppress the noise frequencies of the gas.

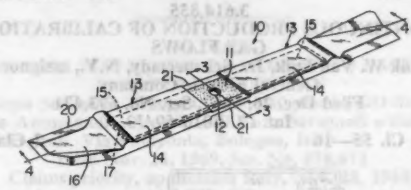
3,614,860
SUCTION CLEANER
Karl Gustav Grellsson, Sollentuna, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden
Filed Mar. 13, 1969, Ser. No. 807,777
Claims priority, application Sweden, Mar. 15, 1968, 3,400/68
Int. Cl. B01d *46/10*
U.S. Cl. 55—276 **2 Claims**

This invention relates to a suction cleaner having an elongated casing formed with an air inlet at one end and an air outlet in a transverse wall at its opposite end. A chamber, which is defined in part by the transverse wall and a combined filter and diffuser unit, receives air flowing from the air outlet. The combined filter and diffuser unit is U-shaped and has an end which extends transversely of the cleaner at the vicinity of the air outlet end thereof and spaced apart sides which extend at opposing sides of the cleaner from the closed end toward the transverse wall. The U-shaped filter and diffuser unit, which includes a U-shaped grate or apertured frame and a fine filter in the form of a layer of material positioned within the closed end and spaced apart sides of the grate, has a cross-sectional area greater than that of the air outlet and filters fine dust particles from air flowing into the chamber and diffuses and subdivides the filtered air into a multiplicity



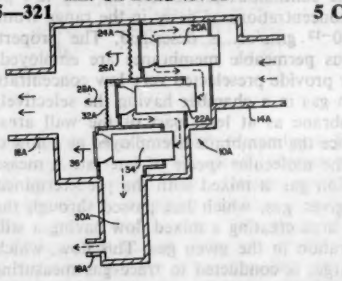
of tiny air streams which are deflected upward and discharged from the unit through a horizontal arc which extends transversely of the cleaner and along the opposing sides thereof.

3,614,861
MOWER BLADE AND METHOD OF MAKING SAME
William T. Wickham and Leland E. Williams, Waynesville, Doyle V. Haren, Clyde, and Robert W. Buchanan, Waynesville, N.C., assignors to Dayco Corporation, Dayton, Ohio
Filed May 26, 1969, Ser. No. 827,587
Int. Cl. A01d *55/18*
U.S. Cl. 56—295 **3 Claims**



A lawn mower blade having a central mounting member and outwardly extending arms of improved strength and comprised of an elastomeric material bonded to the mounting member in an optimum manner, with each arm having a flexible outer portion provided with an integral cutting edge, and a method of making such a blade.

3,614,862
APPARATUS FOR REMOVING CONTAMINANTS FROM GASES
Harold D. Connors, Milford, Conn., assignor to Avco Corporation, Stratford, Conn.
Filed June 30, 1969, Ser. No. 837,431
Int. Cl. B01d *45/12*
U.S. Cl. 55—321 **5 Claims**



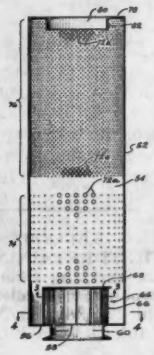
This disclosure describes an apparatus for separating and removing contaminant foreign particles from a gas

or airstream. A plurality of separating stages are assembled in serial flow arrangement so that only contaminant plus a small percentage of carrier air or gas is transmitted to each succeeding stage.

3,614,863
CENTRIFUGAL SEPARATOR HAVING PERFORATED CAN WALL

Robert C. Patterson, Longmeadow, Mass., and Rudolph J. Micheller, East Granby, and John F. Carney, Windsor, Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 31, 1968, Ser. No. 789,049
Int. Cl. B01d 45/12
U.S. Cl. 55—452 7 Claims



A centrifugal separating apparatus comprising a cylindrical can body defining a spinning chamber in which vapor-liquid mixture is rotated at a high velocity to separate the entrained liquid by centrifugal action. The wall of the can body is provided along its length with two distinct perforated portions forming liquid discharge passages for the removal of separated liquid from the chamber. The perforated portion adjacent the inlet end of the chamber presents a liquid flow area substantially less than that of the other portion such that a vortical flow can be established and sustained in the process fluid.

ERRATUM

For Class 56—295 see:
Patent No. 3,614,861

3,614,864
TWO-PLY POLYAMIDE TIRE CORD

Berthold Daimler, Remscheid-Lennep, and Berd Jacobi, Wuppertal-Elberfeld, Germany, assignors to Glanzstoff AG, Wuppertal, Germany

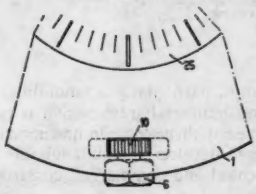
Filed Nov. 21, 1969, Ser. No. 878,958
Claims priority, application Germany, Nov. 23, 1968, P 18 10 618.8
Int. Cl. D02g 3/28, 3/48
U.S. Cl. 57—140 R 10 Claims

A two-ply nylon tire cord in which the individual plies are pretwisted in the direction opposite to the after-twist of the plies in the finished cord, the pretwist being at least 200 turns/meter greater than the after-twist which should provide a twist factor α_m of the about 60 to 140. A plurality of such two ply cords are assembled into a rubber tire structure to provide improved performance characteristics.

3,614,865
WATCH-CASE WITH A WATERTIGHT WINDING CROWN

Hans Widmer, Bienne, and Peter Aebi, Brittern, Switzerland, assignors to Omega Louis Brandt & Frere S.A., Bienne, Switzerland

Filed Sept. 24, 1969, Ser. No. 860,690
Claims priority, application Switzerland, Oct. 23, 1968, 15,819/68
Int. Cl. G04b 37/08
U.S. Cl. 58—90 9 Claims

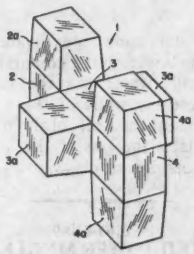


A watch-case with a watertight winding crown, in which the crown has a threaded portion capable of engaging, as it is moved axially, the tapping of a nut guided in an opening of the watch-case and having a fixed axial position, rotation of said nut resulting, on the one hand, in displacing the crown inwardly without causing it to rotate about its own axis, while compressing at least one gasket against a shoulder of the watch-case, and, on the other hand, in locking the crown in its inner position, the crown head, having a noncircular periphery, being engaged at least partially in a noncircular cut-out part of the watch-case.

3,614,866
POLYPOD STRUCTURE FOR CIVIL ENGINEERING USES

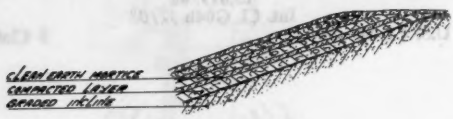
Taisuke Kaneko, Ehime-ken, and Fumiyasu Morioka, Sapporo-shi, Hokkaido, Japan, assignors to Kyowa Concrete Kogyo Kabushiki Kaisha Sapporo-shi, Hokkaido, Japan

Filed Apr. 1, 1969, Ser. No. 811,983
Claims priority, application Japan, Feb. 21, 1969 (utility model), 44/15,388
Int. Cl. E02b 3/04, 3/12, 3/14
U.S. Cl. 61—3 8 Claims



A polypod block is composed of at least three pillar-shaped parts integrally joined with alternately crossed relationship, the block thereby having at least six legs, and the dimensions and shape of the block are so selected that a large number of these blocks can be interlocked in several ways to form tightly assembled combinations of the blocks for purposes such as wave breaking, soil erosion control, and dissipation of the energy of flowing water.

3,614,867
METHOD OF SANITARY LANDFILLING
Tom Nieman, Sedalia, Colo., assignor to Landfill, Incorporated, Commerce City, Colo.
Filed Feb. 13, 1970, Ser. No. 11,164
Int. Cl. E02d 3/12
U.S. Cl. 61—35 8 Claims



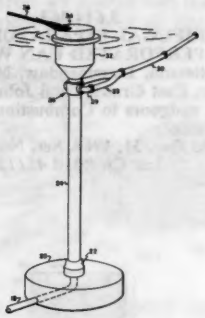
City dumps, particularly a landfilling operation, utilizing city and industrial trash which is compacted, moistened, sprayed with insecticide and morticed with a clean earth layer to develop a landfill suitable for recreation or both residential and commercial construction activity.

3,614,868
METHOD FOR STABILIZING AN EXCAVATED TRENCH BY STABILIZATION OF ASBESTOS SUSPENSION
Mamoru Shinozaki, Tokyo, Japan, assignor to Takenaka Komuten Company, Ltd., Higashi-ku, Osaka-shi, Osaka-fu, Japan
Filed July 16, 1969, Ser. No. 842,307
Claims priority, application Japan, July 17, 1968, 43/50,784
Int. Cl. E02d 17/08
U.S. Cl. 61—35 2 Claims

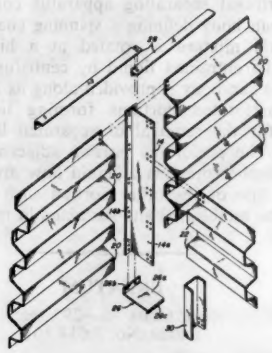
A method for stabilizing an excavated trench by filling the trench with a liquid slurry containing asbestos fibers in suspension with water. As the liquid slurry flows through the permeable walls of the trench the asbestos fibers will tend to seal the walls of the trench. The method further contemplates the use of the asbestos suspension along with a suspension of clay.

3,614,869
PIVOTED TOWER SINGLE POINT MOORING SYSTEMS
John F. Flory, Morristown, N.J., and William R. Philliber, Sale, Victoria, Australia, assignors to Esso Research and Engineering Company
Filed Sept. 9, 1969, Ser. No. 856,446
Int. Cl. E02b 17/02; B63b 21/00
U.S. Cl. 61—46 7 Claims

A pivoted tower single point mooring and cargo handling system, primarily for tanker vessels, is provided which comprises a buoyancy chamber with attached rigid pipe which is pivotally connected to a mooring foundation, a flexible cargo conduit for conducting cargo from the base of the buoyancy chamber to the vessel, means for conducting cargo from the foundation through the pipe to the base of the buoyancy chamber and swiveling means at the base of the buoyancy chamber for permitting the flexible cargo conduit to rotate with respect to the buoyancy chamber.



3,614,870
SOIL TIGHT RETAINING WALL
Jerald H. Boynton, Franklin, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio
Filed Sept. 22, 1969, Ser. No. 859,706
Int. Cl. E02d 29/02
U.S. Cl. 61—47 8 Claims



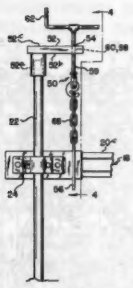
A soil tight retaining wall of the bin type having a plurality of pairs of vertical connectors, each connector having a flange portion and a web portion extending laterally from the center line of the flange portion so as to have a T-shaped cross section. The flange portion of one vertical connector of each pair is parallel to the front of the wall and the flange portion of the other connector of the same pair is parallel to the rear of the wall. Lapped stringer members join the vertical connectors to form the front and rear of the wall, each end of each stringer member being attached to a part of the flange portion on one side of the web portion of one of the vertical connectors. Lapped spacer members join the pairs of vertical connectors, the ends of each spacer member being attached to the web portions of the vertical connectors of a pair.

3,614,871

METHOD APPARATUS, AND DOCK MEMBER COMPONENTS FOR ERECTING, ALIGNING, REALIGNING, OR DISASSEMBLING A DOCK MEMBER

Edwin A. Nordell, Lyndhurst, Ohio, assignor to The Metal Craft Company, Chardon, Ohio

Filed June 14, 1968, Ser. No. 737,159
Int. Cl. E02b 3/20
U.S. Cl. 61—48 5 Claims



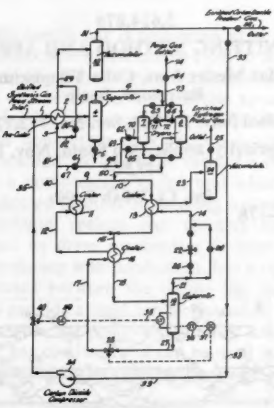
Method, apparatus and dock member component or components for erecting, disassembling, aligning and/or realigning a dock member easily erectable (as a complete dock, a modular dock component, or an extension of on an existing dock) by a single person even in deep water without the use of boats and without getting wet; and including a dock deck elevator, dock member post clamp bracket, a connector for operatively connecting two dock members, and/or combination member connector and post clamp bracket, etc.

3,614,872

SYNTHESIS GAS SEPARATION PROCESS

Joseph P. Tassoney, Whittier, and Warren G. Schlinger, Pasadena, Calif., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 22, 1967, Ser. No. 692,864
Int. Cl. F25j 1/00, 3/00, 3/06
U.S. Cl. 62—26 12 Claims



Superatmospheric autorefrigeration process for separating a gaseous mixture comprising essentially hydrogen and carbon dioxide into an enriched hydrogen product stream and an enriched carbon dioxide product stream.

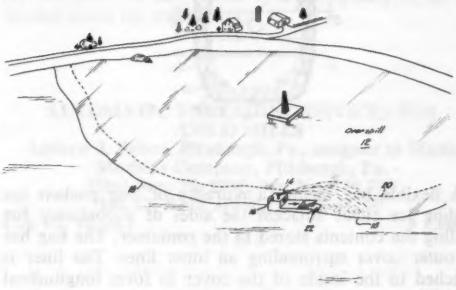
The gaseous feedstream at a pressure of about 40 to 250 atmospheres is cooled so that 30 to 95% of the carbon dioxide is condensed by noncontact counterflow heat exchange with refrigerants, and liquid carbon dioxide is then separated from the uncondensed gases. The two departing product streams are separately employed as refrigerants to cool said fractions of the feedstream. The temperature of the enriched carbon dioxide product stream and when desired, such as at start-up, the temperature of the enriched hydrogen product stream is further reduced by expansion to about the triple point of carbon dioxide (and even lower for the enriched hydrogen stream) without solid formation. A portion of the enriched carbon dioxide product stream is recycled to the inlet of the process and combined with the feedstream to improve the separation efficiency of the system. The enriched hydrogen product stream may be used directly as feedstock for chemical synthesis or may be further processed to make pure hydrogen.

3,614,873

FREEZING OIL SPILLS

Edward L. Cole, Fishkill, and Howard V. Hess, Glenham, N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Oct. 1, 1969, Ser. No. 862,716
Int. Cl. F25c 5/00
U.S. Cl. 62—66 6 Claims



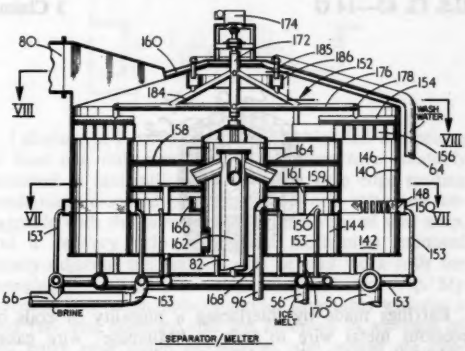
Cleaning up marine oil spills by freezing the surface layer of oil, preferably with particles of Dry Ice or the like, to enable the layer to be screened off the surface as a cake.

3,614,874

SEPARATOR-MELTER UNIT FOR DESALINATION

Allan Martindale, Bramhall, Bryan R. Parr, Sale, and Michael J. S. Smith, Abingdon, England, assignors to Simon-Carves Limited, Stockport, Cheshire, England

Filed Jan. 15, 1968, Ser. No. 697,804
Claims priority, application Great Britain, Jan. 17, 1967, 2,349/67
Int. Cl. B01d 9/04
U.S. Cl. 62—123 9 Claims



In the production of fresh water from saline water, ice crystals formed by boiling a volatile refrigerant in

the saline water, are separated from saline water in one chamber and passed over to another for melting to provide the fresh water.

3,614,875

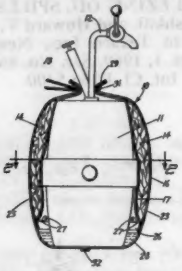
APPARATUS FOR HOLDING ARTICLES

Gerald Lee McCallun, 1720 W. 76th, Richfield, Minn. 55423

Filed Aug. 18, 1969, Ser. No. 850,866

Int. Cl. F25d 3/08

U.S. Cl. 62—372 10 Claims



A flexible bag having a plurality of side pockets for holding ice cubes adjacent the sides of a container for cooling the contents stored in the container. The bag has an outer cover surrounding an inner liner. The liner is attached to the inside of the cover to form longitudinal pockets accommodating the ice. The bottom of the liner has a plurality of holes for draining water to the bottom of the cover. A closure cord is used to close the top of the bag about the container.

3,614,876

EAR-RING AND METHOD OF MANUFACTURE

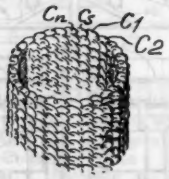
Jacques Henri Lenfant, 47 Rue des Petits-Champs, Paris, France

Filed June 6, 1969, Ser. No. 830,941

Claims priority, application France, June 7, 1968, 154,124

Int. Cl. A44c 7/00

U.S. Cl. 63—14 G 3 Claims



Earrings made by interlacing a plurality of coils of precious metal wire to form a "Milanese" wire gauze which, in turn, is formed into a tube and then shaped into the form of a split toroid so that the abutting ends thereof will exert a resilient gripping force in tension.

3,614,877

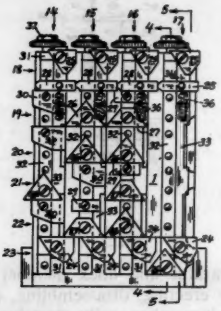
COMPOUND STITCH CAM FOR KNITTING MACHINES

Jack Radin, Brooklyn, N.Y., assignor to Monarch International Ltd., Brooklyn, N.Y.

Filed Mar. 14, 1969, Ser. No. 807,312

Int. Cl. D04b 9/38, 15/76

U.S. Cl. 66—42 13 Claims



A compound stitch cam, particularly for use at each feed of a multi-feed latch needle ciricular knitting machine, comprising a fixed main and an adjustable auxiliary stitch cam to act upon a pair of vertically spaced butts on the shanks of the latch needles in the machine, the said stitch cams also being vertically spaced with the main stitch cam acting upon the lower ones of said butts to lower the needles to less than their stitch forming level and with the auxiliary stitch cam thereafter acting upon the upper ones of said butts to lower the needles to their stitch forming level. The said compound stitch cam and the latch needles being arranged in combination with needle selecting pattern means on the said machines for three level selection of the needles to welt, tuck and knit positions.

3,614,878

FLAT KNITTING METHOD AND APPARATUS

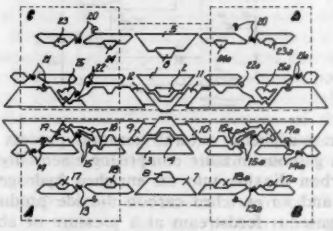
Matias Mestre Mas, Calle Vilapiscina 33, Barcelona, Spain

Filed Nov. 1, 1968, Ser. No. 772,728

Claims priority, application Spain, Nov. 11, 1967, 347,504

Int. Cl. D04b 7/00

U.S. Cl. 66—78 4 Claims



A flat knitting method and apparatus for bringing about a change in the width of the knitted fabric particularly in connection with the knitting of a collar or neck region

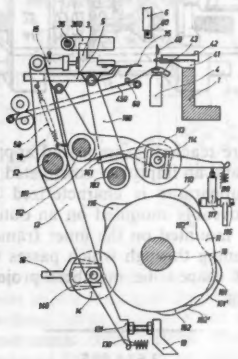
of a garment. The knitting machine includes a series of longitudinally displaceable needle assemblies movable in opposed directions between operative and inoperative positions, and preselected needle assemblies are displaced in one of these directions by a displacing means which may be automatically actuated, to bring about in this way a change in the width of the knitted fabric. Where the displacing means is used to displace selected needles to inoperative positions, the loops carried thereby are transferred to needles which continue to participate in the knitting, and the displacing means preferably takes the form of swingable butt-engaging members which turn about a predetermined axis to produce the displacement of selected needle assemblies.

3,614,879

FLAT-KNITTING MACHINE FOR ALTERNATELY PRODUCING DOUBLE WELTS OR RIB WELTS

Hansjoachim Suppe, Ingolstadt, Germany, assignor to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Germany

Filed Apr. 9, 1969, Ser. No. 815,533
Claims priority, application Germany, Apr. 9, 1968, P 17 60 141.1
Int. Cl. D04b *1/04*
U.S. Cl. 66—88 **17 Claims**



The machine needle bar is connected to its drive mechanism by a connection which can be rigid to transmit knitting movement from the drive mechanism to the needle bar or which can be resiliently yieldable to exert a draw off force on the machine needle bar while a welt is being produced. The connection may include a coupling arm having two telescopic parts pressed toward a shortened relationship by a compression spring and which parts can be rigidly connected together by latching a control rod. Alternatively, tension springs can connect the machine needle bar and its drive mechanism to exert a resilient draw off force during welt production, but a coupling arm can be connected between the needle bar and its drive mechanism to provide a rigid connection when it is desired to drive the needle bar positively to effect knitting movements. A welt bar or a welt rod can be used in addition to the machine needles to provide further draw off force.

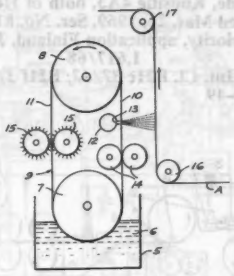
3,614,880

FABRIC DAMPENER

Alexander J. Bayne, Schenectady, and Paul N. Winberg, Hempstead, N.Y., assignors to Cluett, Peabody & Co., Inc., Troy, N.Y.

Filed Mar. 3, 1969, Ser. No. 803,693
Int. Cl. D06f *35/00*; B05c *5/00*
U.S. Cl. 68—205 R **5 Claims**

This invention is directed to a dampener for a continuously advancing fabric web and includes a pair of vertically aligned rolls that carry an endless mesh belt that has one loop partly immersed in water. A pair of stripper rolls remove excess water from the pick up flight of the



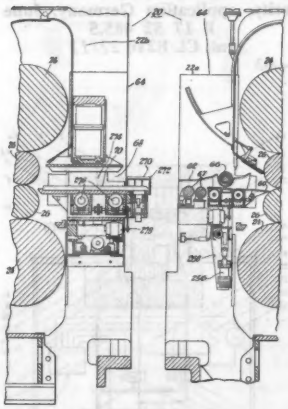
belt and the retained water is blown as a fine mist from the belt onto the fabric web by a multiplicity of air jets located above the stripper rolls.

3,614,881

AUTOMATIC THREADING DEVICES FOR COLD MILLS

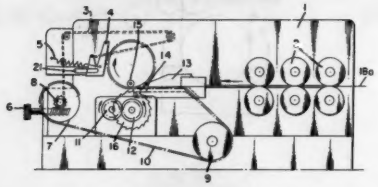
Andrew J. Petros, Pittsburgh, Pa., assignor to Mesta Machine Company, Pittsburgh, Pa.

Filed June 25, 1968, Ser. No. 739,720
Int. Cl. B21b *37/00, 39/20, 41/00*
U.S. Cl. 72—12 **9 Claims**



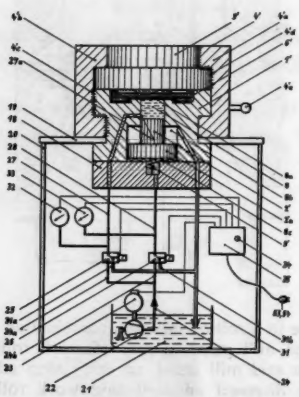
I disclose in a rolling mill, the combination comprising at least one mill stand, a pair of work rolls rotatably mounted in said mill stand, an entry strip edge guiding mechanism disposed adjacent said work rolls and engageable with the lateral edges respectively of said strip, and a delivery strip edge guide mechanism mounted closely adjacent the delivery side of said work rolls for engaging the lateral edges respectively of said strip. My invention also contemplates similar apparatus wherein a feed reel and deflector roll are mounted in advance of said entry edge guide mechanism, and means are provided for simultaneously and transversely moving said deflector roll and said feed reel for strip alignment purposes.

3,614,882
MACHINE FOR MANUFACTURING HELICALLY SEAMED TUBING FROM A STRIP-LIKE PROFILED BLANK
Eino Kalervo Malkki, Et. Hesperiankatu 18A2, and Valentin Silde, Kuusitie 4A3, both of Helsinki, Finland
Filed Mar. 26, 1969, Ser. No. 810,470
Claims priority, application Finland, June 7, 1968, 1,617/68
Int. Cl. B21c *37/12*; B21f *3/10*
U.S. Cl. 72—49 6 Claims



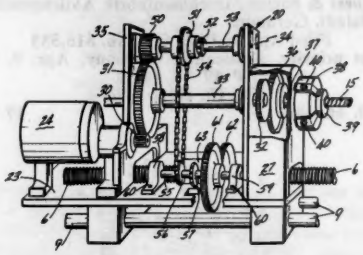
A machine manufactures helically seamed tubing from a strip-like profiled blank. The machine includes two seaming rolls cooperating with a loop consisting of a flexible traction element. The blank is forcibly fed into the loop and is bent into a tubular shape with guidance by the loop. A support member is used to support the tube while it is being formed from the outside, namely, the side opposite to the direction of feeding of the blank.

3,614,883
DEVICE FOR PRESSING PIECES OF SHEET METAL
Klaus E. Kramer, 14 Kommandantenstr., 45 Berlin, Germany
Filed June 3, 1969, Ser. No. 830,161
Claims priority, application Germany, June 4, 1968, P 17 52 485.5
Int. Cl. B21d *22/12*
U.S. Cl. 72—63 8 Claims



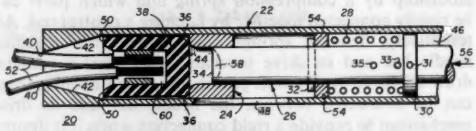
A device for hydraulically pressing sheet metal in which a flexible diaphragm extends transversely through a chamber formed at one end of a cylinder body to divide the chamber into two chamber spaces. The sheet metal to be pressed is sandwiched in one of the chamber spaces between the flexible diaphragm and a matrix in the one chamber space, the open end of which is closed by a closure member clamped by releasable clamping means against the one end of the cylinder body. The other chamber space communicates with a bore in the cylinder body in which a piston is reciprocably arranged and pressure fluid is first fed into the bore portion communicating with the other chamber space and then against the piston face facing away from the diaphragm to pressurize the fluid.

3,614,884
PROCESS FOR FORMING CORRUGATED TUBING
Joseph Winter, New Haven, Conn., assignor to Olin Mathieson Chemical Corporation
Original application Oct. 31, 1967, Ser. No. 679,459. Divided and this application Mar. 25, 1969, Ser. No. 840,564
Int. Cl. B21d *15/04*
U.S. Cl. 72—77 5 Claims



The disclosure teaches an improved apparatus for corrugating tubes and an improved corrugated tube produced thereby. The apparatus is characterized by having an inner frame moveably mounted on an outer frame, with a die rotatably mounted on the inner frame. The die has an annular opening through which passes the tube to be corrugated and shaped die members projecting into the annular opening.

3,614,885
EXTRUSION TOOL
Daniel Eppler, Toms River, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.
Filed Apr. 9, 1970, Ser. No. 27,073
Int. Cl. B21c *27/02*
U.S. Cl. 72—259 30 Claims



The invention is directed to an improved extrusion tool. Slidably disposed within an open-ended selectively bored restrictively orificed elongated housing is an outer hollow plunger and at least one inner plunger in aligned telescoping cooperation with and resiliently coupled to the outer plunger, to permit the successive selective deformation of an article disposed within the housing. Mounted adjacent the open front end of the housing may be adjusting means for selectively restricting the orificial dimension thereof. The front end of the inner plunger may be appropriately contoured to form a complementary impression on an article intimately engaged therewith.

3,614,886

PROCESS FOR PRODUCING STEEL SHEETS FOR CANS HIGH IN THE ANTICORROSION

Toshiro Nishihara, Hidejiro Asano, and Yashichi Ouyagi, Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jan. 26, 1970, Ser. No. 5,495
Claims priority, application Japan, Feb. 3, 1969, 44/8,059
Int. Cl. B21b *3/02*
U.S. Cl. 72—365 4 Claims

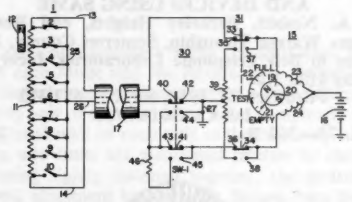
A process for producing steel sheets for cans which are high in the workability, particularly in the can-producing property and in the anticorrosion, particularly adapted to store carbonated beverages, comprising hot-rolling an extremely low carbon steel material containing less than 0.030% C, and 0.02–0.10% S and of S/P>1 and then cold-rolling the thus obtained hot-rolled steel sheet in one step at high reduction rate to a product of final gauge of less than 0.5 mm.

3,614,887

BITE FOR LIQUID LEVEL AND QUANTITY MEASURING SYSTEM

Malcolm E. Douglass, Wenham, Mass., assignor to General Electric Company

Filed May 13, 1969, Ser. No. 824,105
Int. Cl. G01f *25/00*
U.S. Cl. 73—1 R 8 Claims



Test equipment which is permanently built into the instrument permits in situ testing of the instrument sensor and indicator without using auxiliary test equipment or removing the instrument from service. The built-in test equipment is designed for use with an instrument of the type utilizing an impedance element in the sensor. It includes a test impedance of known magnitude which is permanently associated with the instrument. The test impedance is selectively switched into the circuit with the sensing impedance. If the sensing impedance is functioning properly, the two impedances in the circuit will produce a pre-set response on the instrument indicator. This shows the operator that his instrument is functioning properly. If, however, a fault is present, the instrument indicator does not show the pre-set response providing thereby an immediate indication of the presence of a fault.

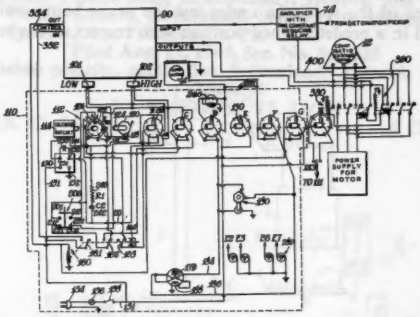
3,614,888

MAXIMUM KNOCK DETERMINING METHOD AND APPARATUS

John T. Jones, Ardsley, and Gilbert C. de Malvilain, West Nyack, N.Y., assignors to Ethyl Corporation, New York, N.Y.

Filed Jan. 6, 1969, Ser. No. 789,308
Int. Cl. G01n *33/22*
U.S. Cl. 73—35 5 Claims

Automatic knock testing of gasoline with engine having automatic compression ratio control that changes compression ratio to maintain predetermined knock intensity, is effected with quicker and simpler maximum knock fuel-air ratio search that first lowers fuel-air ratio and then increases it at a fairly rapid rate, the increasing being terminated when the compression ratio control stops calling for a decrease in compression ratio, and then an adjustment is made for overshooting of the fuel-air ratio increase. Alternatively the increase in fuel-air ratio can be effected in steps at least about 10 seconds apart, these



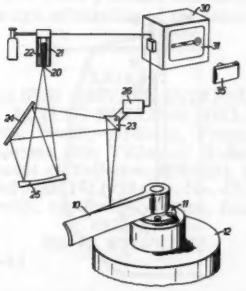
steps being terminated when the compression ratio decrease steps pause for at least about the same length of time as the spacing between fuel-air ratio increase steps. No adjustment is needed with this alternative.

3,614,889

VIBRATION TESTING OF SPECIMENS

James Walter Gearing, St. Leonards-on-Sea, England, assignor to Derritron Electronics Limited, St. Leonards-on-Sea, Sussex, England

Filed Nov. 20, 1969, Ser. No. 873,734
Claims priority, application Great Britain, Nov. 21, 1968, 55,264/68
Int. Cl. G01n *29/00*
U.S. Cl. 73—67 8 Claims



In a method of locating stresses in a specimen being vibrated by an electro-mechanical vibrator, the infra-red radiation from different points on the specimen surface, due to variations of temperature caused by stress, is detected by scanning the image of a detector over the surface. The variation may be indicated or recorded by using the detector output to control an electron beam which is similarly scanned over a screen.

3,614,890

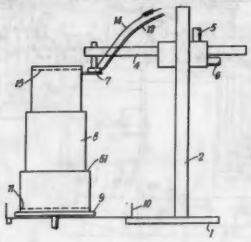
PROBE MANIPULATORS FOR ULTRASONIC FLAW DETECTION APPARATUS

Edward Arthur Benjamin Bates, London, England, assignor to Glass Developments Limited, London, England

Filed Nov. 29, 1968, Ser. No. 779,963
Claims priority, application Great Britain, Nov. 29, 1967, 54,391/67
Int. Cl. G01n *24/00*
U.S. Cl. 73—71.5 10 Claims

Ultrasonic flaw testing apparatus is disclosed for dealing with stepped or other discontinuous surfaces. The

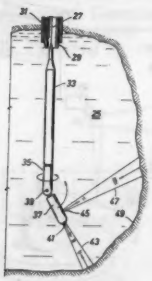
probe carriage has inner and outer fork members sprung apart with the probe pivotally mounted across the limbs of the inner fork and maintained in a predetermined position by a balance weight. Wheels are mounted at the ends of the limbs of the outer fork for engagement with the surface of the specimen under test the probe being maintained in a predetermined position with respect of the surface by the spring between the forks and the balance weight acting on the pivot. The carriage is slidably mounted on an arm and is urged by a second spring against the surface, microswitches controlling an electric motor for moving the arm being arranged to be actuated when the limits of movement under control of the second spring are exceeded.



3,614,891
WELL SURVEYING INSTRUMENT AND METHOD

Ernst P. Nolte, Hildesheim, Germany, assignor to Prakla-Seismos G.m.b.H., Hannover, Germany

Filed Mar. 17, 1969, Ser. No. 807,883
Int. Cl. E21b *47/00*
U.S. Cl. 73—151 29 Claims



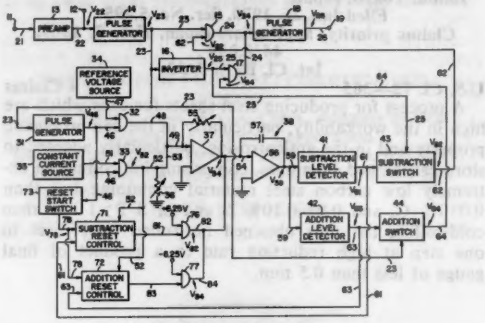
A surveying instrument for investigating the character of an underground cavity penetrated by a borehole, includes an elongated instrument housing and a lower section containing means to generate and receive energy, such as a surveying transceiver. The lower section is pivotally and rotatably movable about the lower end of the housing enabling the entire surface of the cavity to be surveyed.

3,614,892
FLOWMETER TEMPERATURE COMPENSATION SYSTEM AND METHOD

Sidney Allan Ottenstein, Summerville, N.J., assignor to M & J Valve Company and M & J Development Company, both of Houston, Tex.

Filed Apr. 11, 1969, Ser. No. 815,313
Int. Cl. G01f *1/04*
U.S. Cl. 73—233 16 Claims

System and method relating to liquid flowmeters for adding pulses to and subtracting pulses from the flowmeter's digital pulse train in accordance with temperature deviations from a reference temperature, volumetric flow rate, and the coefficient of expansion of the liquid. A signal having a magnitude proportional to the liquid temperature and a frequency dependent on the flow rate is generated and compared with a reference signal. The difference between the two signals is amplified, compensated in accordance with the coefficient of expansion of the liquid, and integrated to provide control of the addition and subtraction of pulses.



3,614,893
SPLAT-COOLED Fe-Co-V AND Fe-Co-Cr ALLOYS AND DEVICES USING SAME

Ethan A. Nesbitt, Berkeley Heights, and Ronald H. Willens, Warren Township, Somerset County, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 23, 1967, Ser. No. 677,312
Int. Cl. G01k *7/38*
U.S. Cl. 73—362 R 2 Claims

An inductive thermometer in which the inductor core consists of a splat cooled alloy of either the Fe-Co-V or the Fe-Co-Cr systems, both of which have been found to evidence paramagnetic properties at room temperatures and ferromagnetic properties upon cooling to 1.4° K.

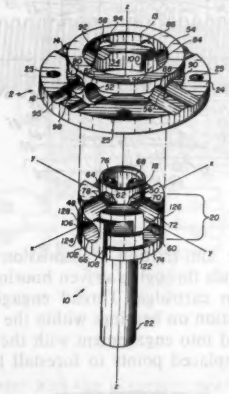
3,614,894
GYROSCOPE FLEXURE HINGE ASSEMBLY

Willis B. Ensinger, Silver Spring, Md., assignor to The Singer Company, New York, N.Y.

Filed Jan. 30, 1969, Ser. No. 795,302
Int. Cl. F16c *29/00*; G01c *19/04*
U.S. Cl. 74—5 14 Claims

An improved flexure hinge suspension for use in free-rotor displacement type gyroscopes is provided comprising an inner hinge unit and an outer hinge unit concentrically nested one within the other in a generally parallel manner coaxial with the gyro's spin or reference axis. Each hinge unit, in turn, comprises a frictionless, four-bar,

two-axis, universal-joint suspension element for supporting the gyro's inertial flywheel relative to the spin axis in a particular directional mode. That is, in the inner hinge unit, the flexure bars have their respective longitudinal axes arranged perpendicular to the spin axis so as to support the flywheel against torsional and radial displacements relative to the spin axis while in the outer hinge unit the flexure bars have their respective longitudinal axes oriented parallel to the spin axis so as to support the flywheel



against axial displacements along the spin axis. Furthermore, in each hinge unit the flexure bars comprise locally thin necked-down sections formed by machining a corresponding pair of closely spaced holes completely through the peripheral wall of each unit as the case may be. Thus, when the two units are positioned relative to each other before being rigidly fastened together, the desired exact orthogonal alignment between the flexure bars the outer unit and the corresponding flexure bars in the inner unit may be facilitated by a simple visual inspection thereof.

3,614,895

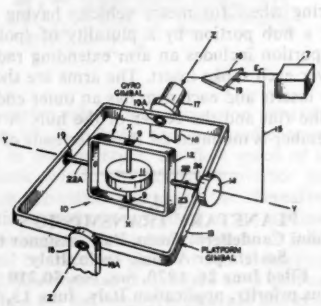
GYRO PLATFORM ERECTION SYSTEM

William Packard, Fair Lawn, Frank S. De Carlo, Westwood, and Bruce Finkelstein, Hackensack, N.J., assignors to The Bendix Corporation

Continuation-in-part of application Ser. No. 717,538, Apr. 1, 1968. This application June 26, 1969, Ser. No. 836,932

Int. Cl. G01c *19/30*

U.S. Cl. 74—5.41 **9 Claims**



A gyroscope mounted to a platform gimbal and including a float having a groove and precessing through an angle to contact limiting spring means in the groove, said springs means providing a torque for gyro erection.

3,614,896

ECCENTRIC MECHANISM FOR CONVERTING A ROTARY MOVEMENT INTO A RECIPROCATING RECTILINEAR MOVEMENT OF VARIABLE AMPLITUDE

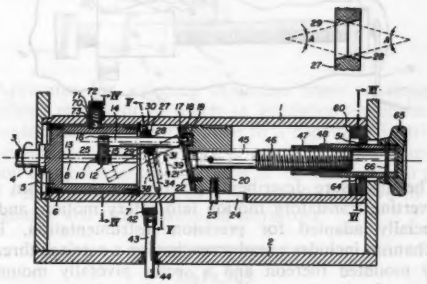
Manuel Claude Sanz, Grand-Lancy, Geneva, and Rene Weber, Geneva, Switzerland, assignors to Micromedic Systems, Inc., Philadelphia, Pa.

Filed Aug. 11, 1969, Ser. No. 849,025

Claims priority, application Switzerland, Aug. 16, 1968, 12,398/68

Int. Cl. F16h *21/18, 33/00*

U.S. Cl. 74—42 **6 Claims**



In an eccentric mechanism for converting the input rotary movement of a rotary member into an output reciprocating linear movement, in order to vary asymmetrically the amplitude of the output movement, a slotted cup-like rotary member drives a cylindrical crank-pin through an eccentric lug and offset socket so that its axis describes an eccentricity-setting cone having its contour delimited by a high position and a low position, and having a generatrix parallel to the axis of rotation of the rotary member.

3,614,897

COUPLING FOR DRIVING INTERMITTENTLY ACTING ROLLING MILL

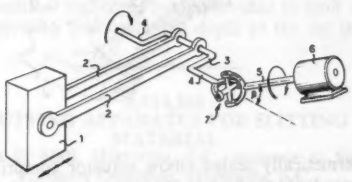
Pierre Peytavin, Neuilly-sur-Seine, France, assignor to Societe Anonyme dite: Vallourec (Usines a Tubes de Lorraine-Escaut et Vallourec Reunies), Paris, France

Filed June 19, 1970, Ser. No. 47,261

Claims priority, application France, June 24, 1969, 6921147

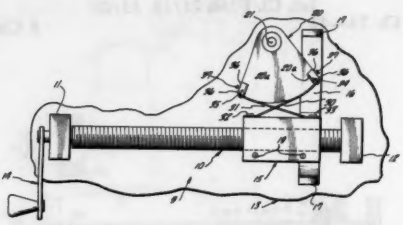
Int. Cl. F16h *21/22*

U.S. Cl. 74—44 **2 Claims**



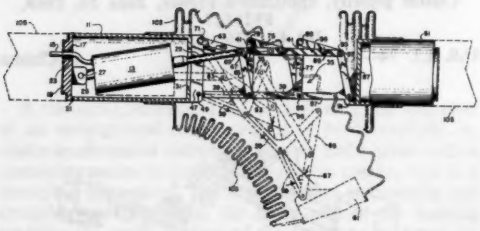
The crankshaft driving the reciprocating cage of an intermittently acting rolling mill is driven from a constant-speed motor through a universal joint with the motor shaft positioned at an angle to the crankshaft in a plane perpendicular to the plane of reciprocation of the cage, so that cyclical irregularities in the angular speed of the crankshaft due to the mass of the cage are compensated for by complementary irregularities due to the angular drive through the universal joint.

3,614,898
POSITIONING MECHANISM
T. O. Paine, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Kenneth G. Johnson, Los Angeles, Calif.
Filed Aug. 7, 1969, Ser. No. 848,282
Int. Cl. F16h 27/02
U.S. Cl. 74—89.15 4 Claims



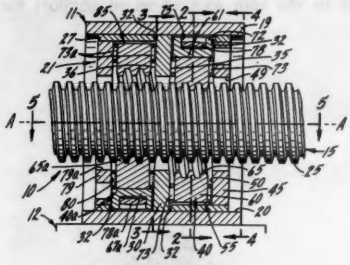
The disclosure describes a positioning mechanism for converting translatory motion into rotary motion, and is especially adapted for precision instrumentation. The mechanism includes a lead screw having a carriage threadedly mounted thereon and a sector pivotally mounted about a fixed axis normal to that of the lead screw and connected to the carriage by means of a pair of flexible bands. The sector is also provided with adjustment means for maintaining each of the bands in a taut condition between the carriage and the sector. Upon translatory movement of the carriage by rotation of the lead screw, the sector is drawn about its pivot by the carriage via the bands.

3,614,899
HERMETICALLY SEALED ELBOW ACTUATOR
Hans F. Wuenscher, Huntsville, Ala., assignor to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration
Filed Aug. 25, 1969, Ser. No. 852,843
Int. Cl. F16h 15/50, 21/44; G05g 1/04
U.S. Cl. 74—105 6 Claims



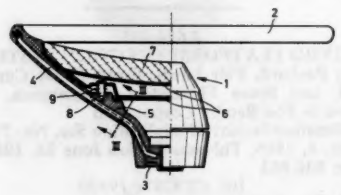
A hermetically sealed elbow actuator comprising first and second pairs of pivotally connected angular actuating elements arranged between a base member and a head member. The base member houses a motor that forces incremental deflection of the actuating elements and the head member through a system of drive rods and expandable linkages. Limited deflection of each pair of actuating elements permits all of the moving parts, including the motor, to be hermetically sealed by a metallic bellows since the deflection of each pair of actuating elements is small enough to be within the bending tolerance of the bellows.

3,614,900
ANTI-FRICTION DRIVE
Gunnar A. Wahlmark, Grand Detour, Ill., assignor to Wahlmark Systems, Inc., Chicago, Ill.
Filed May 8, 1970, Ser. No. 35,762
Int. Cl. F16h 1/20, 55/22
U.S. Cl. 74—424.8 12 Claims



A screw type anti-friction transmission device. The drive screw extends through a driven housing including a foce transmission cartridge. Thread engaging rings are mounted for rotation on bearings within the cartridge and are radially urged into engagement with the screw thread at 180-degree displaced points to forestall backlash.

3,614,901
STEERING WHEEL FOR MOTOR VEHICLES
Bodo Henning, Braunschweig, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfgang, Germany
Filed Dec. 16, 1969, Ser. No. 885,482
Claims priority, application Germany, Dec. 17, 1968, P 18 15 130.9
Int. Cl. B62d 1/04
U.S. Cl. 74—552 3 Claims

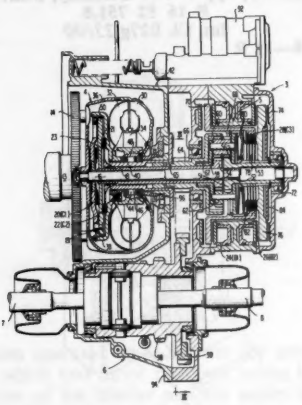


A steering wheel for motor vehicles having a rim attached to a hub portion by a plurality of spoke inserts. The hub portion includes an arm extending radially outwardly over each spoke insert. The arms are shorter than the spoke inserts and each arm has an outer end disposed between the rim and the center of the hub. A shock absorber member is mounted on the outer ends of the arms.

3,614,902
PLANETARY TRANSMISSION
Giovanni Candellero, Turin, Italy, assignor to Fiat Societa per Azioni, Turin, Italy
Filed June 26, 1970, Ser. No. 50,210
Claims priority, application Italy, June 13, 1970, 69.039/70
Int. Cl. F16h 37/08, 47/08, 57/10
U.S. Cl. 74—695 4 Claims

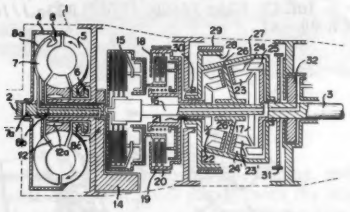
An automatic transmission having a hydraulic torque converter and a planetary gear set drivingly connected thereto by means of a plurality of hydraulically actuated

clutches positioned between the hydraulic torque converter and an engine and connected to the planetary gear set by means of a plurality of concentrically positioned input shafts. The output of the planetary gear set is through an output gear that is located concentrically around the input shafts and is positioned between the



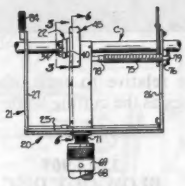
torque converter and the planetary gear set. A plurality of forward drive gear ratios and a reverse ratio is obtained by selectively engaging the clutch means positioned between the engine and the torque converter, as well as additional friction engaging devices positioned radially outwardly from the planetary gear set.

3,614,903
TRANSMISSION APPARATUS
Masaaki Noguchi and Shigeru Sakakibara, Aichi-ken, and Tomoo Ishihara, Tokyo, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi-ken, Japan
Filed Nov. 15, 1968, Ser. No. 776,149
Int. Cl. F16h *47/08, 5/42;* **B60k** *21/08*
U.S. Cl. 74—868 **41 Claims**



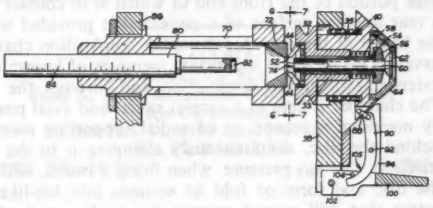
This invention relates to transmission apparatus of the fluid variety which includes various speed change gearing. According to the invention, the flow speed of the circulating volume within the torque convertor portion of transmission apparatus is detected and thereafter utilized in the application of pressurized oil to the various portions of the transmission apparatus so that an oil pressure proportional to the flow speed of the circulating volume is obtained. The obtained pressurized oil is then used as the actuating fluid for the respective clutches and brake bands present within the transmission apparatus which act in combination to change the ratios of the speed change gearing and, in addition thereto, detect the shift points at which the automatic changes in the gear ratios are carried out.

3,614,904
INSULATION STRIPPING APPARATUS
Jerry R. Young and Richard T. Wilcox, Charlotte, N.C., assignors to Utilities Research, Inc., Charlotte, N.C.
Filed Jan. 20, 1970, Ser. No. 4,302
Int. Cl. H02g *1/12*
U.S. Cl. 81—9.5 R **16 Claims**



Apparatus for stripping insulation from an elongate insulated conductor in which an insulation cutter means mounted for movement relative to a conductor is driven in simultaneous and coordinated rotation about and translation along the longitudinal axis of the conductor so that the cutter means describes a spiral path relative to the conductor and strips insulation therefrom.

3,614,905
APPARATUS FOR WIRE AND CABLE CUTTING AND STRIPPING
Zdzislaw Bieganski, Apem Works, St. Albans Road, Watford, England
Filed Mar. 21, 1969, Ser. No. 809,329
Claims priority, application Great Britain, Mar. 27, 1968, 14,633/68
Int. Cl. H02g *1/12;* **B26b** *27/00;* **B21f** *13/00*
U.S. Cl. 81—9.5 **5 Claims**

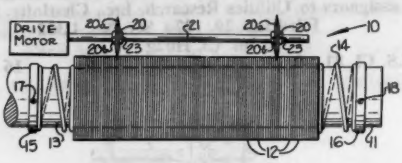


Wire and cable stripping apparatus having cutters which are rotated around the wire and are pivoted, the cutters being axially displaceable along the direction of the cable to take them against an anvil to pivot them to an operative cutting position, and stops being provided to limit the degree of pivoting and hence the depth of the cut into the cable.

3,614,906
CUTTING APPARATUS FOR SLITTING MATERIAL
Clyburn E. Hall, Hartsville, S.C., assignor to Sonoco Products Company, Hartsville, S.C.
Filed Sept. 3, 1969, Ser. No. 854,826
Int. Cl. B26d *1/22*
U.S. Cl. 83—505 **7 Claims**

Cutting apparatus for slitting material comprising an anvil including a plurality of very thin discs, preferably from about .005 inch to about .010 inch thick, coaxially mounted in side-by-side relation and for resilient axial movement relative to each other. At least one rotating cutting blade having an axis of rotation substantially parallel to the axis of the discs is superimposed in cooperative relationship with the discs for slitting material passing

therebetween. The cutting edge of the cutting blade is received by and wedged between two of the discs by axially

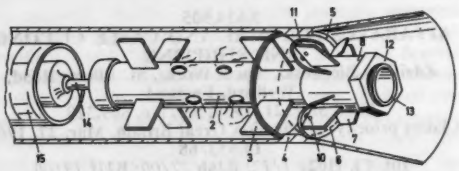


moving the discs relative to each other and passing between the two discs as the cutting blade rotates.

3,614,907
BLOW-OUT DISC

Nils E. Haglund and Knut G. Knutsson, Eskilstuna, Sweden, assignors to Forenade Fabriksverken, Eskilstuna, Sweden

Continuation-in-part of application Ser. No. 672,573, Oct. 3, 1967. This application Mar. 12, 1969, Ser. No. 806,373
Claims priority, application Sweden, Oct. 4, 1966, 13,358/66
Int. Cl. F41f *3/02, 15/00*
U.S. Cl. 89—1.7 **4 Claims**

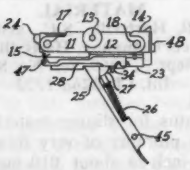


A ductile metal damming washer or disk, the marginal edge portion of the front end of which is in contact with a rear annular surface of a constriction provided within the barrel of the gun. A sub-calibre combustion chamber having a set of radial supporting members of known type, extends through the constriction and through the disc. The chamber is kept in a correct radial and axial position by means of a second set of radial supporting members behind the disc, simultaneously clamping it to the constriction. The gas pressure, when firing a round, will split the disc and form or fold its sections into tab-like elements that will extend around the leading end of the supporting members in the rear set of said radial supporting members.

3,614,908
REMOVABLE UNITARY ACTION FOR A FIREARM

Gary Wilhelm, Hamden, Conn., assignor to Stoeger Arms Corporation, South Hackensack Township, Bergen County, N.J.

Filed Oct. 7, 1968, Ser. No. 766,380
Int. Cl. F41c *19/00*
U.S. Cl. 89—132 **5 Claims**

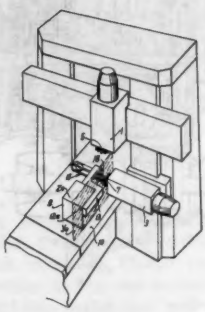


Shown is a toggle action recoil operated semiautomatic pistol whose action as a unitary assembly is removably secured in the hollow frame of the pistol by a pin, a spring loaded plunger and a set screw.

3,614,909
APPARATUS FOR ADJUSTING CUTTING TOOLS FOR THEIR USE IN TOOL MACHINES, IN PARTICULAR MILLING MACHINES

Rolf-Dieter Neuser, Coburg, Bavaria, Germany, assignor to Werkzeugmaschinenfabrik Adolf Waldrich Coburg, Coburg, Bavaria, Germany

Filed Mar. 4, 1969, Ser. No. 804,236
Claims priority, application Germany, Mar. 15, 1968, P 16 52 751.8
Int. Cl. B27g *23/00*
U.S. Cl. 90—11 R **10 Claims**

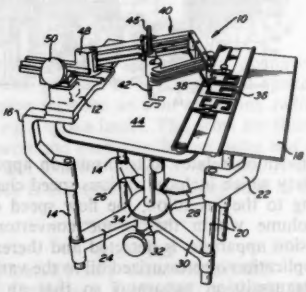


An apparatus for adjusting the infeed of cutting tools in tool machines, in particular milling machines. There is provided on the machine table or on a workpiece clamped on the machine table a zero point of a three-dimensional coordinate system. The tool cutting edge is thereafter brought into one of the reference planes defined by the coordinate axes by means of a measuring and indicating device. The measurement readable on the scale associated with the tool support is determined as a zero value and the infeed of the tool toward the workpiece is then carried out according to this scale.

3,614,910
FONT OF TYPE

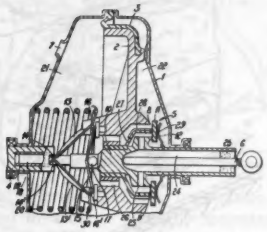
George Berlant, Bellerose, N.Y., assignor to New Hermes Engraving Corporation, New York, N.Y.

Filed Nov. 12, 1969, Ser. No. 875,614
Int. Cl. B23g *33/00, 35/42;* **B23c** *1/16*
U.S. Cl. 90—62 **8 Claims**



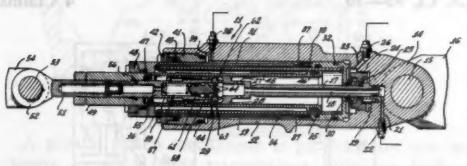
A pattern font of type is provided whereby a single, double or triple thickness letter may be engraved by using the single pattern font. The stylus of a conventional engraving machine is used to trace the desired thickness letter from the pattern font of type, and a remote engraver is utilized to engrave the letter having the desired thickness.

3,614,911
BRAKE BOOSTER
Juan Belart, Walldorf, Germany, assignor to International Telephone and Telegraph Corporation, New York, N.Y.
Filed Oct. 3, 1969, Ser. No. 863,453
Claims priority, application Germany, Oct. 4, 1968, P 18 01 022.5
Int. Cl. F15b *9/10*
U.S. Cl. 91—369 B 15 Claims



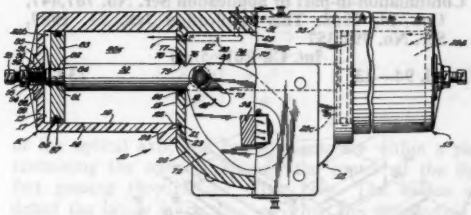
A vacuum operated brake booster for power assisted brakes in which two thrust members acting between the power piston of the booster and the power transmitting member for the master cylinder are held at an angle with respect to the piston axis by a resilient tie strip connecting the ends of the thrust members. The center section of the tie strip continuously exerts a reaction force on the actuating linkage to eliminate slack in the system.

3,614,912
TELESCOPING PISTON, CENTRAL LOCK HYDRAULIC ACTUATOR
Donald L. Nepp, San Pedro, Calif., assignor to Lionel Pacific, Inc., Anaheim, Calif.
Filed Sept. 29, 1969, Ser. No. 861,563
Int. Cl. F15b *15/26*
U.S. Cl. 92—25 8 Claims



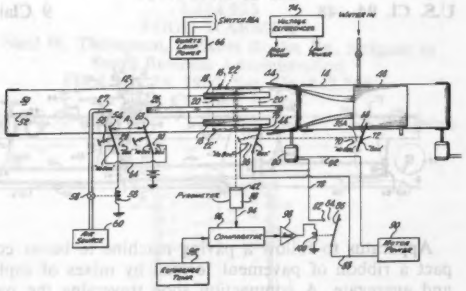
A hydraulic actuator employing telescoping, independently movable outer and inner pistons with the inner piston movable independently to an extended position, while the outer piston remains retracted, or with both pistons extended for the maximum movement of the operator which is mounted on and moves with the inner piston. Both pistons are substantially cylindrical in form, the inner piston having locking elements carried therein, which are movable radially when the pistons are retracted, for effecting locking engagement with a stationary part carried by the body of the actuator and received within the inner piston when it is in retracted position. The inner piston carries a locking-unlocking piston for effecting radial movements of said locking elements into and out of locking engagement with a stationary member. A port is provided for pressurizing the inner piston only for extension, a second port is provided for pressurizing the outer piston for extension, and a third port is provided for pressurizing both the pistons for retracting movement thereof.

3,614,913
PNEUMATIC OPERATING MEANS FOR A VALVE
Malcolm D. Clark, Glasgow, Scotland, assignor to Raymond Control Systems, Inc.
Filed Apr. 11, 1969, Ser. No. 815,410
Int. Cl. F01b *7/00*
U.S. Cl. 92—138 14 Claims



A pneumatically operated valve actuator employs a centrally located piston rod which is slidably supported over a substantial length of its travel by upper and lower guiding rails or tracks and which is movable in response to the receipt of fluid operating pressures which are directed simultaneously through two branches of a fluid circuit internally of the actuator and against the faces of a pair of oppositely disposed pistons carried by the piston rod so that the branch fluid circuits cooperably power the actuator. Total piston areas may be varied by changing or eliminating cylinders. Additionally, the actuator may be employed for placing its corresponding controlled valve in a desired fully open or fully closed position in response to an alarm condition by a biasing arrangement having spring means which is loaded by operation of the actuator. The actuator is preferably constructed primarily of plastic components to minimize friction and provide for ease in formation of the fluid circuits therein.

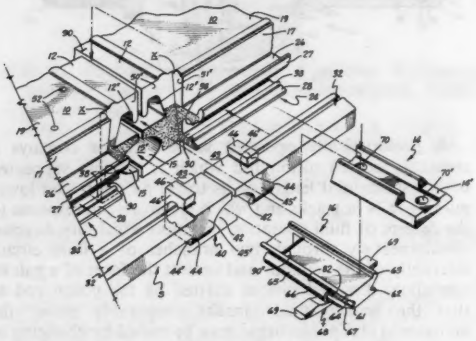
3,614,914
BOX SEALING MACHINE
John A. Troll, Ridgefield, Conn., assignor to Iris Corporation
Filed July 31, 1969, Ser. No. 855,059
Int. Cl. B31b *1/00*
U.S. Cl. 93—36 R 9 Claims



A novel sealing method and apparatus is described for the sealing of cardboard boxes. The boxes are coated with temperature sensitive sealer at at least the portion where a seal is to be made. The box portion is suitably heated with a source of radiation of a predominant wavelength range. A temperature sensor is employed which is sensitive to radiations outside the wavelength range of the

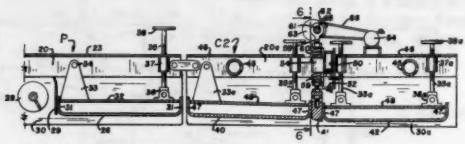
source of radiation. The temperature sensor monitors the heated box portion and supplies a control signal when the desired temperature has been attained.

3,614,915
PANEL ASSEMBLY AND METHOD
Robert E. Perry, Lafayette, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.
Continuation-in-part of application Ser. No. 767,447, Oct. 14, 1968. This application Jan. 21, 1969, Ser. No. 792,357
Int. Cl. E01c *5/00*
U.S. Cl. 94—13 **23 Claims**



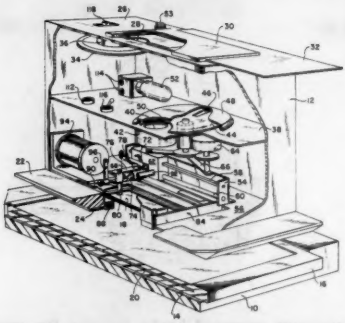
This invention relates to an improved load supporting and load transferring panel system for use in landing mat installations and the like comprised of a plurality of removably interlocked panels and wherein the joints formed by the various marginal edges of the interlocked panels are provided with improved cooperating locking and sealing means to prevent the penetration of water and the like through the joint structures as well as to facilitate installation of the overall panel system and access to individual panels that may become damaged in use.

3,614,916
COMPACTING APPARATUS FOR FINISHING HOT MIX PAVEMENT
Jewell R. Benson, 1111 S. Colorado Blvd., Denver, Colo. 80222
Filed Apr. 13, 1970, Ser. No. 27,504
Int. Cl. E01c *19/30*
U.S. Cl. 94—48 **9 Claims**



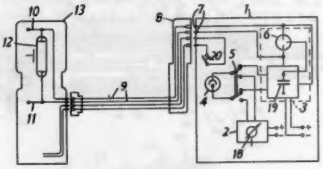
Apparatus to follow a paving machine to better compact a ribbon of pavement formed by mixes of asphalt and aggregate. A compaction shoe traversing the pavement is confined between a leading surcharge plate and a trailing finishing plate. The pressure of the compaction shoe against the pavement which is sufficient to distort the pavement surface at each side of the shoe, effects the desired compaction because of the restraining action of the surcharge and finishing plates. To more effectively attain the desired compaction, a means is provided to vibrate the compaction shoe.

3,614,917
APPARATUS AND METHOD FOR FORMING A DEVELOPABLE PATTERN ON LIGHT-SENSITIVE FILM CARRIED IN A CASSETTE
Stephen J. Wenthe and Norman N. Lareau, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed May 2, 1969, Ser. No. 821,194
Int. Cl. G03b *17/24*
U.S. Cl. 95—1.1 **6 Claims**



Apparatus for forming a developable pattern on a light-sensitive film carried in a cassette having an openable window, the marking apparatus including a mechanism for holding the cassette in a predetermined position, a device for opening the window, a support for prepared data and means for optically projecting an image of the data through the window onto the film in the casette. The apparatus may also be provided with electrical switch means for preventing its operation if the cassette is not properly received therein.

3,614,918
PHOTOGRAPHIC CAMERAS
Walter Hennig and Heinz Schulze, Dresden, Germany, assignors to VEB Pentacon Dresden Kamera- und Kinowerke, Dresden, Germany
Filed Dec. 5, 1968, Ser. No. 781,482
Int. Cl. G03b *7/00, 15/05*
U.S. Cl. 95—10 **4 Claims**

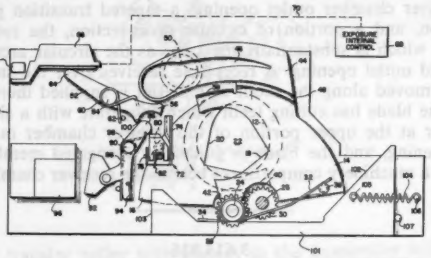


The camera in combination with a flash lamp apparatus is constructed with the light path through the camera. A change over switch is provided in the camera housing which connects alternately a quantitative light meter and a photometer to the photoelectric cell according to choice by means of a changeover switch.

3,614,919
APERTURE DEFINING EXPOSURE CONTROL SYSTEM
Lawrence M. Douglas, Easton, Mass., assignor to Polaroid Corporation, Cambridge, Mass.
Filed Dec. 16, 1968, Ser. No. 784,064
Int. Cl. G03b *7/08, 9/06*
U.S. Cl. 95—10 C **29 Claims**

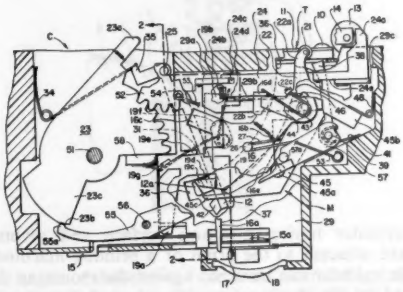
An automatic aperture control system for photographic apparatus which provides for continuous as opposed to incremental regulation of aperture dimension. Aperture

defining blades are linked cooperatively and driven to diverge from a position defining a minimum aperture to a position defining a maximum aperture. In response to a control signal, an electromagnetically actuated braking mechanism halts the movement of the blades when they



reach a proper aperture defining orientation. The brake is characterized in using a pivotally mounted lever having an end which frictionally contacts the surface of at least one of the moving blades in a manner such that it assumes a compressive force counteracting any tendency for further movement of the blades.

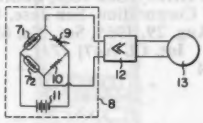
3,614,920
SELF DEVELOPING CAMERA WITH PIVOTABLE PLATEN
Leonard F. Kamp, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Oct. 15, 1968, Ser. No. 767,621
Int. Cl. G03b *17/52*
U.S. Cl. 95—13 **8 Claims**



A pivotal platen mechanism is provided for use in a camera in which slide transparency units are both exposed and processed. The platen pivots out of the exposure plane before exposure of the film and then pivots into the exposure plane to support the film during spreading of a developing fluid across the film.

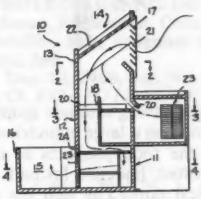
3,614,921
PHOTOELECTRIC DEVICE FOR DETECTING THE FOCUSING
Torakiyo Yamanaka and Keiichi Sakaguchi, Yokohama-shi, and Kazuya Hosoe, Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Dec. 17, 1969, Ser. No. 885,936
Claims priority, application Japan, Dec. 25, 1968, 43/94,496
Int. Cl. G03b *3/12*
U.S. Cl. 95—44 C **4 Claims**

Photoelectric device for detecting whether or not the image of an object to be photographed is correctly focused. On the optical axis of an objective a fixed iris having a small hole on the optical axis and another small hole of the same diameter as that of the small hole on the off-axis position is provided. Behind the other hole a prism to invert the image of the object in the vertical or horizontal is placed and another prism is placed behind the small hole for compensating the light path length to coincide with the light path passing through said first prism. On the focusing plane of the objective lens, two photoconductive elements are provided on both sides



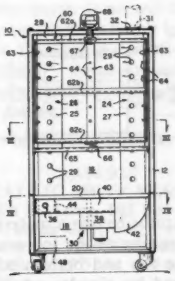
of the optical axis, and two elements are within a plain containing the optical axis and the center of the light flux passing through the other hole. The device can detect the image correctly even when the distribution of brightness of an object is asymmetrical with respect to the optical axis, since two mutually inverted images are superposed upon two photoconductive elements.

3,614,922
NATURAL AIR COOLING SYSTEM
Harris J. Sobin, Apt. 720, Carribean Towers, 760 Ponce de Leon Ave., Santurce, Puerto Rico 00907
Filed Sept. 4, 1969, Ser. No. 855,080
Int. Cl. F24f *13/00*
U.S. Cl. 98—32 **17 Claims**



Natural cooling of buildings and their occupants is obtained through the capturing and controlled flow of naturally occurring wind. The wind is directed to flow through the buildings from a positive pressure area to a negative pressure area so as to provide natural cooling by delivering a flow of air across the inhabited portions of the rooms of the buildings.

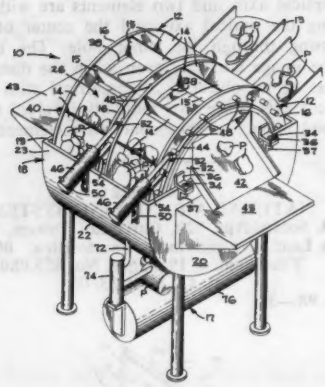
3,614,923
FOOD WARMER
Neal W. Thompson, McKees Rocks, Pa., assignor to Small Business Administration
Filed July 16, 1969, Ser. No. 842,268
Int. Cl. A47j *36/24*
U.S. Cl. 99—234 R **4 Claims**



A food warmer including an upright cabinet having a warming and storage compartment, and a closed forced

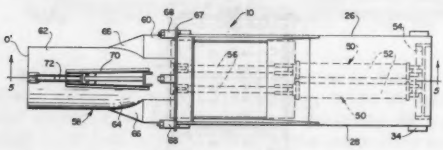
air heating system for providing moisture regulated heated air to the warming and storage compartment whereby food is kept warm under a controlled atmosphere.

3,614,924
CONTINUOUS COOKER
Frank David Hickey, San Jose, Calif., assignor to FMC Corporation, San Jose, Calif.
Filed Aug. 29, 1969, Ser. No. 854,088
Int. Cl. A47j *37/12*
U.S. Cl. 99—404 **5 Claims**



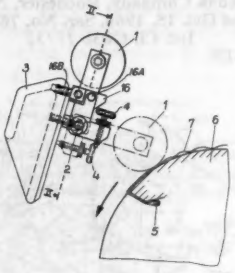
A deep fat cooker having multiple annular pocket reels demountably retained on a large cylindrical hub for rotary movement, cooks the food products as the reel pockets move through a heated, liquefied fat bath in an upwardly open semi-cylindrical tank. The hub has closed ends for displacing fat in the tank. The reels require no submerged axles. Independent ratchet drives for the pocket reels provide for different cooking times for the product carried by each reel.

3,614,925
APPARATUS FOR COMPACTING MATERIAL INTO DRUMS OR BAGS
Milton Clar, Bethesda, Md., assignor to Auto Pak Company, Bladensburg, Md.
Continuation-in-part of application Ser. No. 727,845, May 9, 1968. This application Apr. 30, 1970, Ser. No. 33,284
Int. Cl. B30b *15/06*
U.S. Cl. 100—229 **13 Claims**



Compaction apparatus having a material receiver chamber with an inlet opening at the top and an outlet opening at the front, the top and bottom edges of the outlet opening being defined by circular arcs merging at opposite ends with straight segments which form square corners at the side extremities of the outlet opening. A compaction blade of cross-section substantially the same as the outlet opening, and the cross-section of the lower portion of the material receiver chamber, moves through the chamber and forces material through the outlet opening into a snout. The snout comprises, in succession, a portion of cross-section substantially the same as the receiver chamber outlet opening, a tapered transition portion, and a portion of circular cross-section, the radius of which is substantially the same as the circular arcs of said outlet opening. A receptacle received over the snout is moved along the snout as material is supplied thereto. The blade has cutting teeth which cooperate with a shear bar at the upper portion of the receiver chamber outlet opening, and the blade is guided by elongated members in a machinery compartment behind the receiver chamber.

3,614,926
DEVICE FOR TENSIONING THE MOUNTING SHEET ONTO PRINTING MACHINES
Heinz Brechtel, Frankenthal, Pfalz, Germany, assignor to Schnellpressenfabrik Frankenthal, Albert & Cie Aktiengesellschaft, Frankenthal, Pfalz, Germany
Filed Oct. 15, 1968, Ser. No. 767,797
Claims priority, application Germany, Nov. 16, 1967, P 16 11 294.0
Int. Cl. B41f *25/00*
U.S. Cl. 101—1 **3 Claims**

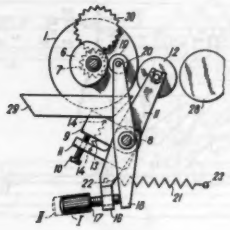


A cylinder having a coarse surface and pivotably mounted adjacent to the drum of a printing machine so that the cylinder can be urged against the mounting sheet retained on the drum to smoothen out and tension the mounting when the drum is rotated against the cylinder. A ratchet catch is also provided for holding the cylinder out of contact with the drum when it is not in use.

3,614,927
MEANS FOR ADJUSTING THE AMOUNT OF DAMPING LIQUID SUPPLIED TO AN OFFSET PRINTING MACHINE
Josef Jurný, Sebranice, Czechoslovakia, assignor to Adamovske strojirny, narodni podnik, Adamov, Czechoslovakia
Filed June 30, 1969, Ser. No. 837,708
Claims priority, application Czechoslovakia, July 1, 1968, 4,821/68
Int. Cl. B41l *23/02*
U.S. Cl. 101—148 **4 Claims**

The damping liquid is transferred from an immersion roller to a damping roller by means of a transfer roller, performing a rocking movement between both rollers. The transfer roller is mounted in brackets supported pivotably on a shaft, which itself is rotatably mounted in the side walls of the machine. A two-arm lever is freely mounted on the shaft, and has on its extremity a roller engaging with the circumference of a cam rotating at a

speed different from that of the immersion roller. Adjustable stop means allow an adjustment of the position of

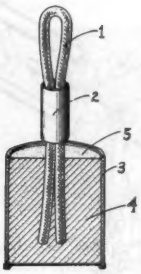


the transfer roller with respect to the immersion roller and the duration of their contact.

3,614,928
CAST HIGH EXPLOSIVE PRIMER

Dale S. Partridge, Shawnee Mission, Kans., Allen Lemoyne Caldwell, Snowflake, Ariz., and Charles E. Tuttle, Jr., Mission, Kans., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Mar. 12, 1969, Ser. No. 806,406
Int. Cl. F42b *3/10*
U.S. Cl. 102—24 **1 Claim**



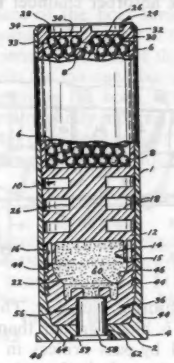
A length of detonating fuse is cut, doubled and the two ends passed through a short length of flexible tubular sleeve. The cut ends of the resulting loop of detonating fuse are then imbedded in a cup of molten high explosive so that, upon cooling, the loop with surrounding sleeve protrudes from the surface of the cast explosive, forming an assembly which is useful in attaching a connecting piece of detonating fuse or in positioning a blasting cap or electric detonator so that the end containing the base charge is maintained in firm physical contact with both the detonating fuse and the surface of the cast high explosive.

3,614,929
PLASTIC SHOTGUN SHELL

George L. Herter and Glen L. Mittelsteadt, Waseca, Minn., assignors to Herter's, Inc., Waseca, Minn.

Filed Apr. 21, 1969, Ser. No. 817,860
Int. Cl. F42b *7/06, 7/08*
U.S. Cl. 102—43 P **6 Claims**

An all plastic shotgun shell comprised of a tubular plastic casing having an integral base wall with an aperture therein through which a primer extends, a plastic over-shot wad closing the end of said tubular casing opposite said base wall, a one-piece plastic shot cup and over-powder wad unit within the tubular casing, and a plastic base wad seated within said casing against said base wall. There is a non-binding fit between the primer and the aperture in the casing base wall, the primer being firmly gripped and

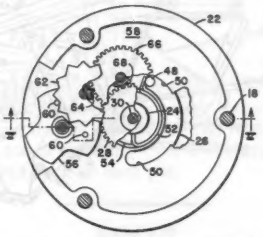


held in place by means of a force fit between the primer and an axial pocket formed within the yieldable base wad into which the primer extends.

3,614,930
RATE CHANGE DEVICES AND PARTICULARLY IMPROVED ARMING DEVICES

Donald A. Brackman, Englewood, Ohio, and John Donald York, Connersville, Ind., assignors to Avco Corporation, Richmond, Ind.

Filed Dec. 23, 1968, Ser. No. 785,933
Int. Cl. F42c *15/12, 15/24, 15/26*
U.S. Cl. 102—76 R **21 Claims**



The disclosure shows two forms of arming devices for bombs having retarder fins. In both devices a G weight is relatively rotated when displaced by a deceleration force. If the deceleration force is maintained for a predetermined period of time, in one device, the bomb is armed, otherwise it is not. In the second device, if the deceleration force is maintained for a predetermined period of time, the bomb is armed in a relatively short period of time, otherwise the bomb is armed in a longer period of time. In the second device, a second G weight provides bidirectional responsiveness to deceleration forces or optionally responsiveness to both acceleration and deceleration forces.

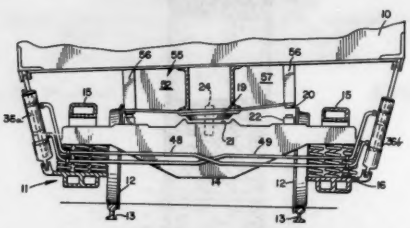
3,614,931
HYDRAULIC SWAY STABILIZER

Franklin P. Adler, 105 Boyd Circle, Michigan City, Ind. 46360

Filed May 12, 1969, Ser. No. 823,795
Int. Cl. B61f *5/14, 5/16, 5/24*
U.S. Cl. 105—199 A **7 Claims**

A sway stabilizer for a railway car including a shock absorber which extends between the car body and the

side frame at each side of the car truck. A conduit extends from the upper end of the chamber of the left shock absorber to the lower end of the chamber of the right shock absorber. A second conduit extends from the lower end of the left shock absorber chamber to the upper end



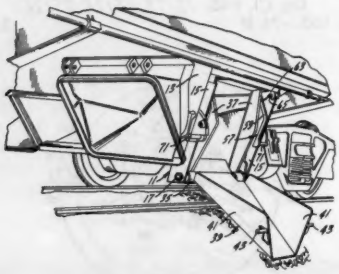
of the right shock absorber chamber. The cross sectional area of the conduit is much greater than the sum of the areas of the several by-pass orifices in the piston. The piston rod extends through both end members of the chamber.

3,614,932

EMBANKMENT TERRACING DOOR FOR HOPPER CARS

Sergio Rene Damy, Apartado Postal 2041, Guadalajara, Jalisco, Mexico

Filed Dec. 27, 1968, Ser. No. 787,379
Claims priority, application Mexico, Jan. 27, 1968, 103,640
Int. Cl. B61d *7/18, 7/26;* **E02f** *5/22*
U.S. Cl. 105—239 **3 Claims**



A terracing door assembly for a hopper car having a locking member that is adapted to lock the door in both its closed and open positions. When the door is closed, the locking mechanism engages the top and bottom portions of the door. In the open position, the locking mechanism engages the bottom portion of the door. A latching mechanism is provided to hold the locking mechanism in its locking positions with the latch arranged so it can selectively be held away from engagement with the locking member.

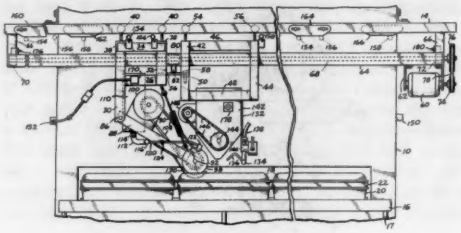
3,614,933

BREAD AND PASTRY PROCESSING APPARATUS

Edward I. Marckx, Portland, and Harvey F. Stines, Gresham, Oreg., assignors to Stinemark Corporation, Gresham, Oreg.

Continuation of application Ser. No. 639,343, May 18, 1967. This application Apr. 17, 1969, Ser. No. 824,723
Int. Cl. A21d *13/00*
U.S. Cl. 107—4 **9 Claims**

Apparatus for splitting, water-spraying and seeding the upper surfaces of bakery products preliminary to baking them is mounted directly in front of the oven. It includes a track, a carriage, and a carriage drive for moving the carriage across the bakery products. Mounted on the carriage are cutters, a spray, and a seeder arranged, respectively, for splitting, spraying, and seeding the upper surfaces of the bakery products. These units



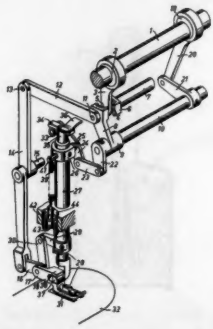
work during a continuous passage of the carriage across the oven door. The processed products then may be introduced immediately into the oven for baking.

3,614,934

SEWING MACHINE WITH UPPER FEED

Herbert Wenz and Heinrich Berg, Kaiserslautern, Pfalz, Germany, assignors to G. M. Pfaff AG, Kaiserslautern, Pfalz, Germany

Filed Aug. 21, 1968, Ser. No. 754,223
Claims priority, application Germany, Sept. 28, 1967, P 30 14 752a
Int. Cl. D05b *27/04*
U.S. Cl. 112—212 **8 Claims**



In a sewing machine having an upper feed dog structurally combined with the presser foot for both horizontal and vertical oscillating movements of said dog, and a common biasing spring arranged to urge both the presser foot and feed dog lift bars into engagement of the presser foot and feed dog with the work, an auxiliary biasing spring acting on the presser foot bar only serves to maintain the same in continuous engagement with the work, independently of pressure variations on the work by the common biasing spring resulting from the vertical feed dog oscillations.

3,614,935

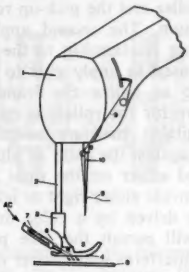
DEVICE FOR DRIVING THE THREAD OUT OF THE WAY FROM UNDER THE PRESSER FOOT OF A SEWING MACHINE

Cesare L. Conti, Via Varese 18, Milan, Italy

Filed Apr. 9, 1969, Ser. No. 814,531
Claims priority, application Italy, Apr. 18, 1968, 829,935/68
Int. Cl. D05b *51/00*
U.S. Cl. 112—218 R **1 Claim**

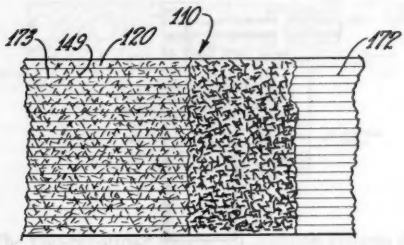
A method for driving off the needle thread from a sewing machine having a cutting mechanism for the needle-thread and the hook thread is disclosed, consisting in projecting an energetic stream of compressed air

from beneath the underside of the presser foot. The device for performing the method essentially comprises a properly oriented air duct, fed by a compressed air



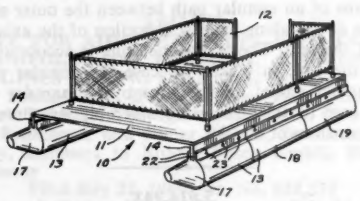
source. The area where the air-stream drives the thread is never critical and the device is extremely simple and absolutely reliable.

3,614,936
NONWOVEN REINFORCEMENT STRUCTURE AND METHOD FOR PRODUCING IT
Thomas E. Philipps, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation
Filed May 9, 1969, Ser. No. 823,459
Int. Cl. B32b *7/08*
U.S. Cl. 112—420 **9 Claims**



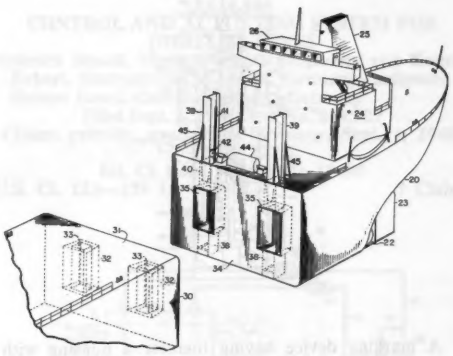
A nonwoven structure and method of making it where the structure includes short lengths of linear material such as glass strand united by nonadhesive means into a coherent body.

3,614,937
PONTOON STRUCTURE
David A. Schulman, 6915 Rosemary Road, Eden Prairie, Minn. 55343
Filed Apr. 9, 1969, Ser. No. 814,621
Int. Cl. B03b *1/12*
U.S. Cl. 114—66.5 F **3 Claims**



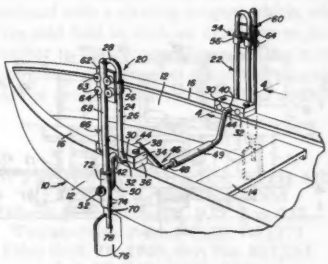
A plurality of modular pontoon float sections of uniform cross sectional dimension are supported in longitudinal alignment with each other along two parallel sides of a pontoon boat deck through the instrumentality of a pair of longitudinally extending parallel flanges extending upwardly from each of the float sections to snugly receive one of a pair of parallel downwardly extending deck floor joists. Transverse aligned openings are provided in the flanges and in the joists to receive bolts for releasably fastening the pontoons to the deck. Pontoon sections at a front end of each aligned set can have a sloping shape to facilitate movement of the boat through the water. The openings in the pontoon flanges or in the deck joists can be slots which will permit removal of the pontoons from the joists after the bolts are loosened but without the necessity of completely removing the bolts. Such a pontoon structure can be semipermanently moored to a pier or the shore to form part or all of a dock, wharf or bridge. It can be lengthened by adding additional float sections to a longer deck or floor.

3,614,938
SHIP CONNECTION
Peter J. Statile, 161 Parkville Ave., Brooklyn, N.Y. 11230
Filed Nov. 24, 1969, Ser. No. 879,167
Int. Cl. B63b *21/00*
U.S. Cl. 114—235 **9 Claims**



A ship has an aft propulsion section and a bow cargo section releasably connected together by vertical I beam pins transfixing mating projections and recesses. The pins may be withdrawn upwardly by a winch driven spur gear which engages a rack on each pin.

3,614,939
PADDLING DEVICE FOR BOATS
Bassil H. Dib, Port St., P.O. Box 6986, Marius Ged Bldg., Beirut, Lebanon
Filed July 28, 1969, Ser. No. 845,247
Int. Cl. B63h *1/06*
U.S. Cl. 115—67 **4 Claims**



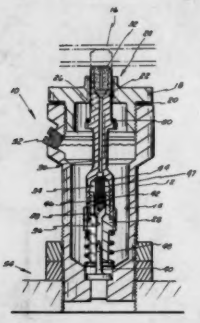
A boat paddling assembly including a rotary input shaft drivingly connected to a paddle member for imparting

paddling movement thereto. The assembly includes an upstanding stationary guide from which the upper end of an upright paddle is slidingly and oscillatably supported and a crank throw of a journaled crankshaft has a midportion of the paddle member journaled thereon with a dog clutch structure being provided on one form of the invention for selectively declutching the crank throw from the crankshaft.

3,614,940
MARKING DEVICE WITH PRESSURIZED FLUID FLOW

Paul S. Abrams, Huntington Woods, and Rudolph G. Peterson, Detroit, Mich., assignors to Carco, Inc., Detroit, Mich.

Filed Apr. 18, 1969, Ser. No. 817,371
Int. Cl. B05c *1/00*
U.S. Cl. 118—3 **6 Claims**

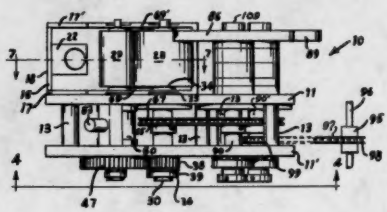


A marking device having therefor a housing with a reservoir for storing a liquid marking agent and a reciprocally mounted feed tube having its inner end extending into the reservoir and its outer end terminating in a marking nib externally of the housing. The feed tube is reciprocated during each marking stroke to engage a plunger within the reservoir to pump a charge of the liquid marking agent into the tube to the marking nib.

3,614,941
GLUE POT

Nicholas J. Perrelli, 131 Woodward Drive, West Seneca, N.Y. 14224

Filed Oct. 3, 1967, Ser. No. 672,590
Int. Cl. B05c *1/00*
U.S. Cl. 118—255 **2 Claims**

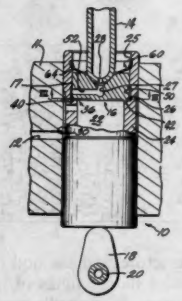


A glue pot having a pick-up roller partially submerged in a glue tub and a metering roller which can be adjusted relative thereto to vary the film thickness of glue on the pick-up roller. These rollers rotate in opposite directions so as to suck up glue from the tub. First and second applying rollers, which apply the glue to a workpiece, are mounted on the frame, and the first applying roller and the pick-up roller travel in counter-wiping relation. The second applying roller travels in counter-wiping relationship to the first. The applying rollers can be used to apply glue to a workpiece which is either above or below the frame. All of the supporting structure for the rollers is mounted in ball bearings having suitable structure associated therewith for shielding them against the entry of glue. All of the rollers can be mounted either on the right side or left side of the frame to provide either right or left handed operation. The rollers are driven by a cable drive through a slip-clutch which will permit the glue pot to stall when a foreign object interferes with proper operation thereof. A universal mounting permits the frame carrying the rollers to be placed at any desired orientation relative to the machine on which it is mounted.

3,614,942
METERED MECHANICAL TAPPET WITH SLOTTED PUSHROD SEAT

Ronald R. Erickson and Richard D. Cornell, Muskegon, Mich., assignors to Johnson Products, Inc., Muskegon, Mich.

Filed Apr. 20, 1970, Ser. No. 29,915
Int. Cl. F01l *1/14*; F01m *9/10*
U.S. Cl. 123—90.35 **10 Claims**



A metered mechanical tappet utilizing a pushrod seat permanently retained by a separate retainer or by a press-fit within the cavity of the tappet upon an annular shoulder of the latter. Oil flow is obtained by a slot in the surface of the seat supported by said shoulder, the slot at least extending radially from the oil reservoir directly below the seat to the outer wall of the seat, from whence it passes to the interior of the seat and to the pushrod by means of an annular path between the outer seat wall and the cavity along at least a portion of the axial extension of the seat. The actual metering is accomplished by either the slot, in which the case the annular path has a substantial radial thickness; or by the annular path, in which case its thickness is considerably less than any of the dimensions of the slot.

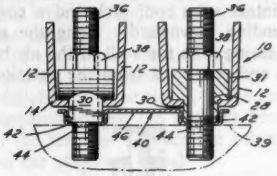
3,614,943
ENGINE ROCKER ARM SUPPORT MEANS

Gerald A. Schley, 6150 Charlesworth, Dearborn Heights, Mich. 48127

Filed June 1, 1970, Ser. No. 42,365
Int. Cl. F01l *1/18*
U.S. Cl. 123—90.42 **4 Claims**

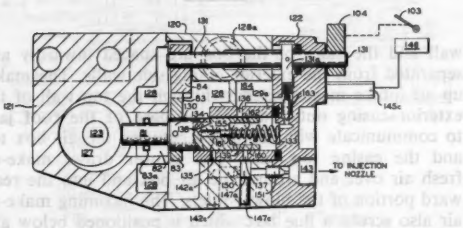
A pair of rocker arms are each mounted to the cylinder head on its own stud, each containing a semi-cylindrical

fulcrum having a flat sided shank depending integrally therefrom and nested in a trough in a plate connecting the fulcrum, the plate preventing relative rotation between



the fulcrums and cylinder head, the fulcrum shape preventing relative rotation laterally between the fulcrums and rocker arms.

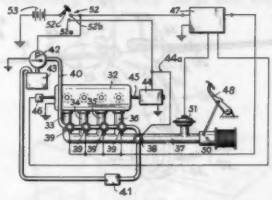
3,614,944
ENGINE APPARATUS
Otmar M. Ulbing, Lisle, N.Y., assignor to Ord Systems Ltd., Port Crane, N.Y.
Continuation-in-part of application Ser. No. 786,233, Dec. 23, 1968. This application Sept. 11, 1969, Ser. No. 857,162
Int. Cl. F02m *39/00*
U.S. Cl. 123—139 AY **31 Claims**



The fuel-per-stroke which fuel injection systems deliver to an engine is varied in accordance with engine speed to provide a desired fuel-air mixture ratio by means of a spring-loaded check valve responsive to momentary pressure impulses occurring in a pump chamber and operative to divert increasing fuel at increasing engine speeds. The check valve spring loading is varied simultaneously with the pump delivery setting in some embodiments, and valve operation is varied in accordance with engine speed and/or acceleration in some embodiments. The system is illustrated in connection with several reciprocating fuel-injection pumps and several rotary fuel-injection pumps.

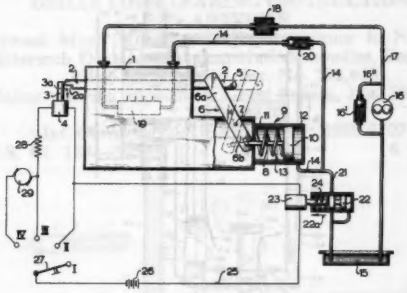
3,614,945
VALVE FOR ADMITTING FUEL INTO INTAKE MANIFOLDS OF INTERNAL COMBUSTION ENGINES DURING STARTING
Walter Schlagmüller, Butthard, Hans Zeller, Doffingen, Rudolf Babitzka, Ludwigsburg-Hoheneck, Otto Glöckler, Renningen, and Dieter Eichler, Bonlanden, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany
Filed July 22, 1969, Ser. No. 843,378
Claims priority, application Germany, July 31, 1968, P 17 51 802.4
Int. Cl. F02n *17/08*
U.S. Cl. 123—179 L **16 Claims**

An internal combustion engine with fuel injection into the intake manifold wherein an electromagnetic valve admits additional fuel into the intake manifold in response to actuation of the starter. The valve can admit fuel continuously or intermittently, either during the time of actuation of the starter or during this time and for an additional predetermined interval of time following termination of such actuation. The coil of the valve is



energized on closing of the starter switch whereby the fuel can flow through a passage of predetermined volume and issues from the orifice of an atomizing nozzle which is installed in the intake manifold.

3,614,946
CONTROL AND ACTUATING SYSTEM FOR DIESEL ENGINES
Heinrich Staudt, Markgroningen-Talhausen, and Konrad Eckert, Stuttgart-Bad Canstatt, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany
Filed Sept. 3, 1969, Ser. No. 854,927
Claims priority, application Germany, Sept. 4, 1968, P 17 76 017.7
Int. Cl. F02d *3/00*; F02n *15/00*
U.S. Cl. 123—179 L **7 Claims**

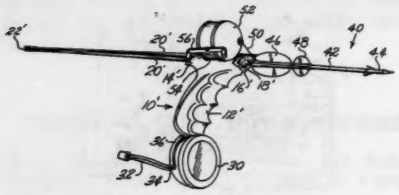


A control and actuating system for operating an internal combustion engine, including a hydraulic servo system which, when energized by virtue of the de-energization of a stop magnet, moves the fuel quantity control member of a fuel injection pump into a zero position; a bolt normally limiting the maximum displacement of said control member to a setting for full load fuel delivery, said bolt is associated with a starting magnet which, when energized, moves said bolt to such an extent as to permit said control member to be positioned in a setting in which the fuel injection pump delivers fuel quantities (starting quantity) that are in excess of the full load fuel quantities.

3,614,947
ARROW PROJECTING DEVICE WITH ARROW RETRIEVING MECHANISM
Marshall H. Feldman, P.O. Box 922, Twenty-Nine Palms, Calif. 92277
Filed Sept. 26, 1969, Ser. No. 861,261
Int. Cl. F41b *7/00, 7/04*
U.S. Cl. 124—20 **11 Claims**

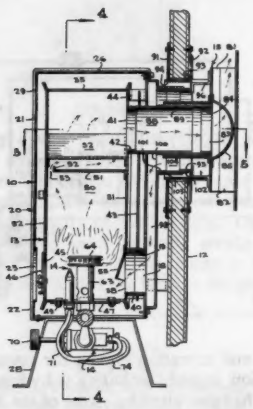
A sling handle topped by a trough member adapted to support an arrow and guide the fletching thereof. Elastic bands detachably adjustably secured to the front of the

member have rear ends interconnected by a short cord receivable in an arrow nock. A drum mounted to the side of the member supports a coil of retrieving line which is connected to the arrow. A light on the lower end of the handle illuminates the target when the sling is aimed there-



at. A retrievable arrow has a barbed head and slidable fletching to which the retrieving line is connected for forwardly disposing a section of the line between the arrow and the drum in the interests of safety. Slidable vanes on the arrow shaft shield the arrowhead to prevent snagging upon retrieval.

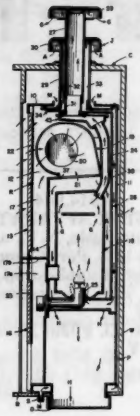
3,614,948
SPACE HEATER
Walter F. Jackson and James F. Wise, Clinton, N.C., assignors to Vann Industries, Incorporated, Clinton, N.C.
Filed Dec. 20, 1968, Ser. No. 785,484
Int. Cl. F23l *17/04;* **F24c** *3/08;* **F24h** *3/00*
U.S. Cl. 126—85 **28 Claims**



A space heater comprising a casing defining a combustion chamber, the casing having an inlet opening and an outlet opening, a burner unit mounted in the combustion chamber, first baffle means disposed in the combustion chamber between the burner unit and the outlet opening directing air heated by the burner unit longitudinally and second baffle means disposed between the burner unit and the outlet opening directing air heated by the burner unit transversely.

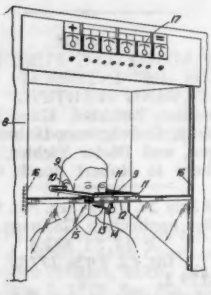
3,614,949
MOBILE HOME FURNITURE WITH MAKE-UP AIR SUPPLY MEANS
James C. Goodgion, Wichita, Kans., assignor to The Coleman Company, Inc., Wichita, Kans.
Filed Feb. 6, 1970, Ser. No. 9,263
Int. Cl. F24h *3/02*
U.S. Cl. 126—110 AA **5 Claims**

A compact sealed combustion furnace adapted to be mounted within a closet or alcove of a mobile home, including a downflow air circulator mounted above a combustion chamber casing within an exterior casing, is provided with a make-up air supply means. More specifically, an air box is mounted above the blower and beneath the top wall of the exterior casing, the air box providing a connecting passage between an annular combustion air intake of a roof jack and a combustion air passage extending downwardly along the rear wall of the exterior casing. The top wall of the air box is spaced downwardly and separated from the exterior casing top



wall and the sides of the box are spaced inwardly and separated from the exterior casing side walls. The make-up air intake means extends through the top wall of the exterior casing outwardly of the base of the roof jack to communicate with the space between the air box top and the casing top wall. The blower draws make-up fresh air over and around the air box and into the rearward portion of the blower inlets. The incoming make-up air also scrubs a flue box which is positioned below and separated from the air box.

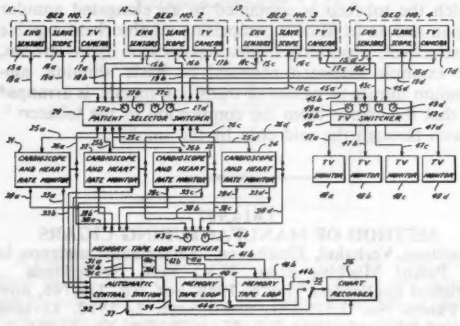
3,614,950
APPARATUS FOR LOCATION RELATIVELY TO A SUBJECT'S CEPHALIC AXIS
Graham Peter Rabey, "Greenbanks," Trout Rise, Loudwater, Hertfordshire, England
Filed Mar. 17, 1969, Ser. No. 807,583
Claims priority, application Great Britain, Mar. 25, 1968, 14,239/68
Int. Cl. A61b *5/10;* **A61c** *19/04*
U.S. Cl. 128—2 R **6 Claims**



A head clamp or face bow, having a pair of coaxial ear plugs which are arranged to be inserted into a sub-

ject's outer ears to locate the subject's cephalic axis relatively to the apparatus. The ear plugs are movable towards and away from one another to accommodate heads of different size whilst maintaining the plugs equidistant from a central reference in the apparatus. A sensing device is interposed between each ear plug and a part of the apparatus which is required to be located in use relatively to the subject's cephalic axis, the sensing devices responding in use to the reaction between the subject's outer ears and the corresponding ear plugs and means are provided whereby the responses of the two sensing devices may be compared so that the subject's head may be adjusted until the reaction between the subject's outer ears and the two ear plugs are equal.

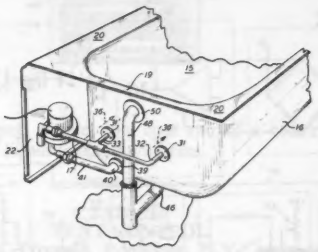
3,614,951
SWITCH-CONNECTED SYSTEM FOR MONITORING HOSPITAL PATIENTS
Cecil Caro, Fort Worth, Tex., assignor to Terrell Supply Company
Filed Jan. 21, 1969, Ser. No. 792,299
Int. Cl. A61l *5/04*
U.S. Cl. 128—2.06 R **11 Claims**



A system which includes a patient selector switcher for enabling a group of primary cardioscope instruments located at a central nursing station to be individually connected to any one of a number of cardiac sensor instruments located at different hospital bed positions and for enabling the primary cadioscope instruments to drive slave cardioscopes located at the corresponding bed positions. The system further includes a memory tape loop switcher for enabling a group of magnetic recorder instruments to be individually connected to any one of the primary cardioscope instruments. The system also includes a television switcher for enabling a group of television monitors located at the central nursing station to be individually connected to any one of a number of television cameras located at the different bed positions.

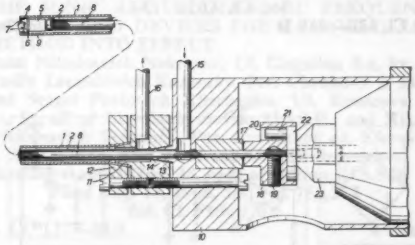
3,614,952
HYDROTHERAPEUTIC BATHTUB
Anthony Dale Agnellino, 465 Monmouth Road, West Long Branch, N.J. 07764
Filed Feb. 16, 1970, Ser. No. 11,751
Int. Cl. A61h *9/00*
U.S. Cl. 128—66 **4 Claims**

An elongated hydrotherapeutic tub with bottom, rear, front and connecting side wall portions of predetermined complementary configurations, to incline a body of water introduced into the bathtub toward the front end wall, and a recirculation assembly wholly mounted on the outside of the front end wall of the bathtub, including jet-projecting straight portions of said recirculation assembly mounted through said front wall of the bathtub and wholly mounted on and replaceable from said front end of the bathtub, below the normal level of said body of water and extending coaxially with the longitudinal axis



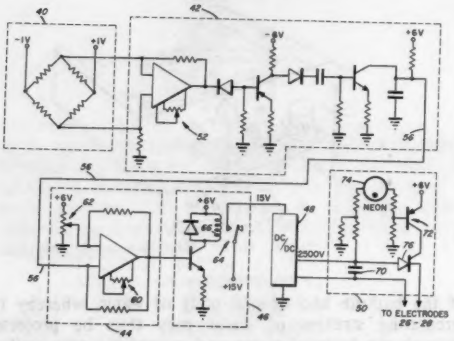
of the bathtub and of said body of water, whereby recirculating streams of water may thus be projected through the body of water and toward the rear wall of said bathtub, upsetting the level and equilibrium of said body of water and agitating the body of water, with beneficial axial hydrotherapeutic action along the user's body.

3,614,953
DRILLS FOR CLEARING OBSTRUCTIONS IN ARTERIES
Edward Moss, Woodley, England, assignor to National Research Development Corporation, London, England
Filed Jan. 21, 1969, Ser. No. 792,655
Claims priority, application Great Britain, Jan. 30, 1968, 4,846/68
Int. Cl. A61b *17/32;* **A01n** *1/00;* **B08b** *9/02*
U.S. Cl. 128—305 **6 Claims**



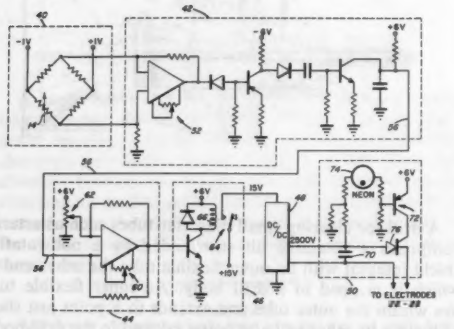
A drill for clearing small diameter tubes such as arteries comprises a rotatable bit surrounded by a non-rotating shield integral with an outer flexible tube the other end of which is gripped in a drill body. An inner flexible tube lies within the outer tube and extends to a point just short of the bit, its other end also being gripped in the drill body. A flexible shaft extends from the bit to which it is fixed, through the inner tube and a bearing in the drill body from which it protrudes to a coupling member fixed to the shaft. Ducts in the drill body lead to the space between the tubes and to the interior of the inner tube enabling flushing liquid to be introduced to and withdrawn from the region of the bit.

3,614,954
ELECTRONIC STANDBY DEFIBRILLATOR
Mieczyslaw Mirowski, Morton M. Mower, and William S. Staewen, Baltimore, Md., assignors to Medtronic, Inc., Minneapolis, Minn.
Filed Feb. 9, 1970, Ser. No. 9,934
Int. Cl. A61n 1/36
U.S. Cl. 128—419 D 13 Claims



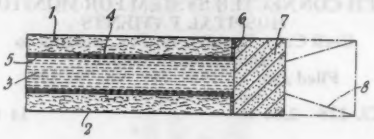
A method and means for automatically defibrillating a malfunctioning heart. With the present invention, the heart function is continuously monitored. When the function becomes abnormal, the malfunctioning heart is automatically shocked by a voltage of substantial size. If the heart does not return to its normal functions after a given interval, then it is again shocked. Normal heart activity ensures that the shocking mechanism remains inert.

3,614,955
STANDBY DEFIBRILLATOR AND METHOD OF OPERATION
Mieczyslaw Mirowski, Baltimore, Md., assignor to Medtronic, Inc., Minneapolis, Minn.
Filed Feb. 9, 1970, Ser. No. 9,935
Int. Cl. A61n 1/34
U.S. Cl. 128—419 D 6 Claims



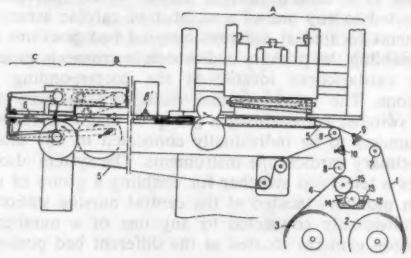
A method and means for automatically defibrillating a malfunctioning heart. With the present invention, the heart function is continuously monitored. When the function becomes abnormal, the malfunctioning heart is automatically shocked by a voltage of substantial size. If the heart does not return to its normal functions after a given interval, then it is again shocked. Normal heart activity ensures that the shocking mechanism remains inert.

3,614,956
SMOKING ARTICLES
Raymond Eric Thornton, Southampton, England, assignor to Brown and Williamson Tobacco Corporation, Louisville, Ky.
Filed Sept. 3, 1968, Ser. No. 756,917
Claims priority, application Great Britain, Sept. 7, 1967, 40,971/67
Int. Cl. A24d 1/04
U.S. Cl. 131—10.5 10 Claims



The invention relates to a tobacco-smoking article in which the tobacco is contained in an elongated annular region and an axial core comprising an absorbent capable of selectively absorbing aromatic polycyclic hydrocarbons, for example activated charcoal or basic alumina, ammonium nitrate or oxides of transition metals, is arranged so that the smoke from the combustion of the tobacco is drawn through the said core by the smoker.

3,614,957
METHOD OF MANUFACTURING CIGARS
Martinus Verbakel, Eindhoven, Netherlands, assignor to Patent Machine Bouw N.V., Best, Netherlands
Original application May 6, 1968, Ser. No. 726,746, now Patent No. 3,526,231, dated Sept. 1, 1970. Divided and this application Feb. 25, 1970, Ser. No. 14,066
Int. Cl. A24b 3/14; A24c 1/30, 3/00
U.S. Cl. 131—20 A 4 Claims



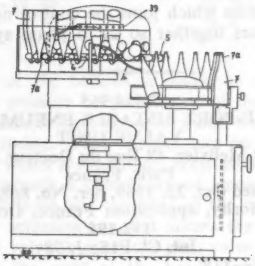
First and second supply means are provided for feeding lengths of binder strip tobacco and wrapper strip tobacco. Conveyor means simultaneously transports the strips in flat-wise superimposed relationship. Guide means is provided for adjusting the lateral overlap of each of the strips with respect to one another. The guide means are adjustably mounted for movement in the direction of the width of each strip. First gluing means is provided for gluing the strips together along the interface thereof. Means is provided for depositing plugs of scrap tobacco on the binder strip and means is provided for

simultaneously wrapping the superimposed strips transversely around such plugs to overlap opposite marginal edges of the strips. Second gluing means is provided for gluing an overlapping marginal zone of one of the wrapped strips to form a substantially cylindrical rod of tobacco product. Means is provided for then cutting this product into predetermined lengths.

ERRATUM

For Class 132—81.5 see:
Patent No. 3,614,961

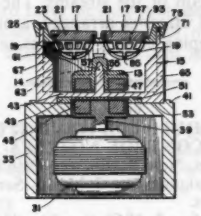
3,614,958
MACHINES INTENDED FOR TURNING BOTTLES, FLASKS OR THE LIKE
Rene Perrier, Le Cheylard, Ardeche, France
Filed Jan. 15, 1969, Ser. No. 791,247
Claims priority, application France, Feb. 9, 1968, 49,631
Int. Cl. B08b *3/00*
U.S. Cl. 134—48 **12 Claims**



A machine for turning bottles has a rotating drum with fixed radial arms between which the bottles are seized one by one at an input zone and borne to an output zone. Each bottle is sequentially turned partly or fully upside down during the transit. Each arm bears a pair of pads; one is rotatable around a horizontal axis and has a concave face corresponding to the curvature of the bottle neck and accompanying the bottle as it turns; the other is borne on a radially outer end of a bent finger hinged at its angle to the arm so as to be angularly displaceable. The shank of the finger projects into an axial cylindrical cavity of the arm and is actuated by a push rod sliding in this cavity against a return spring. The push rod, cushioned by an intermediate spring, is actuated through a further rod driven by a cam on the drum, so as to grip a bottle between the pads. The turn pad is equipped with a nozzle for injecting washing liquid, into the bottle neck automatically at selected positions and is supplied through a chanel and turncock provided in the turn pad and arm. A valve cock governed by cams driven by the drum controls the supply to each arm and a turning joint in the axle of the drum is associated with a liquid distributor having an outlet to each arm.

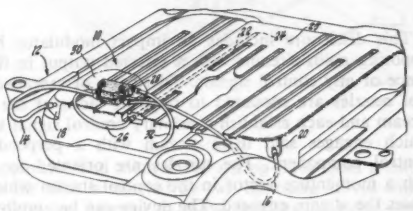
3,614,959
MEANS FOR CLEANING CONTACT LENSES OR THE LIKE
Edgar H. Schollmaier, Norman R. Dewar, and Gerald Hecht, Fort Worth, Tex., assignors to Alcon Laboratories, Incorporated, Fort Worth, Tex.
Filed Mar. 24, 1969, Ser. No. 809,501
Int. Cl. B08b *3/06*
U.S. Cl. 134—117 **7 Claims**

A contact lens holder holds contact lenses suspended within a cleaning solution being agitated by a motor driven agitator within a cleaning container. The lens holder also fits interchangeably with a soaking container. The



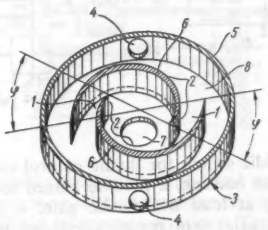
unit is compact, simple, low cost and of a construction which avoids liquid leakage problems.

3,614,960
VENT CONTROL
Kenneth R. Pfrengle, Rochester, N.Y., assignor to General Motors Corporation, Detroit, Mich.
Filed Apr. 28, 1969, Ser. No. 819,926
Int. Cl. B65d *51/16*; F16k *33/00*
U.S. Cl. 137—43 **1 Claim**



Vent lines from a vehicular gasoline tank are connected to a vent control device having a float operated valve which prevents loss of liquid fuel from the tank.

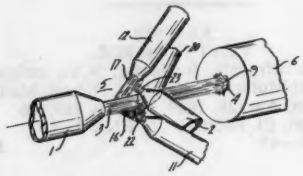
3,614,961
METHOD OF GENERATING VIBRATIONS IN THE SONIC AND ULTRA-SONIC FREQUENCY RANGES AND DEVICES FOR CARRYING SAID METHOD INTO EFFECT
Nikolai Nikolaevich Nekrasov, Ul. Gagarina 5-a, kv. 45; Vasily Leonidovich Kazansky, Per. Chekhova 2, kv. 1; and Sergei Pavlovich Kirichenko, Ul. Kutuzova 22, kv. 52, all of Novokuibyshevsk, U.S.S.R.; and Nikolai Nikiforovich Tsyganov, Pos. Zavodskoi, ul. Kievskaya 4, kv. 4; and Alexei Alexandrovich Sergeichev, Ul. Tsyolkovskogo 10, kv. 28, both of Syzran, U.S.S.R.
Filed Aug. 13, 1968, Ser. No. 752,272
Int. Cl. F15c *1/16*
U.S. Cl. 137—81.5 **4 Claims**



A method of generating oscillations in fluids comprises directing two fluids streams through nozzles at an acute angle with one another to a deflecting blade disposed at

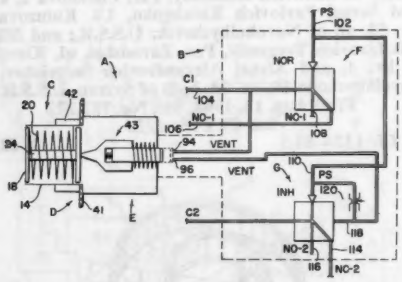
the point of intersection of the two streams of fluid fed from the nozzles so as to deflect the streams, the blade forming an acute angle with each of the nozzles at the point of intersection of the streams. The nozzles may be formed by spiral streams arranged around a discharge port with overlapping central portions serving as the deflecting blades.

3,614,962
IMPACT MODULATOR HAVING CASCADED CONTROL NOZZLES
Louis D. Atkinson, New Berlin, and Otto R. Munch, West Allis, Wis., assignors to Johnson Service Company, Milwaukee, Wis.
Filed Mar. 3, 1969, Ser. No. 803,588
Int. Cl. F15c *1/20*
U.S. Cl. 137—81.5 **16 Claims**



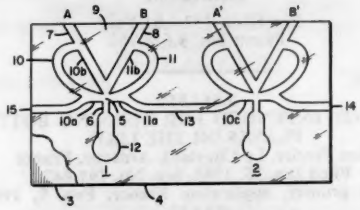
This disclosure includes an impact modulator having opposing main streams with a selected output in the absence of any control signals. Two pairs of cascaded control nozzles are mounted to opposite sides of the main stream and each establish a primary control signal stream which engages said main stream with a perpendicular control component. The nozzles are oriented to establish a momentum vector in the control stream which opposes the stream engaged. The device can be employed to establish positive gain, negative gain and logic functions.

3,614,963
FLUIDIC PUSHBUTTON/OPERATORS
David Jon Matteson, Drexel Hill, Pa., assignor to Gulf + Western Industrial Products Company, Grand Rapids, Mich.
Filed Mar. 11, 1969, Ser. No. 806,166
Int. Cl. F15c *3/00*
U.S. Cl. 137—81.5 **8 Claims**



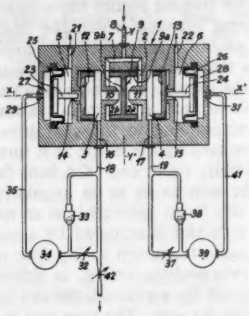
A novel fluidic switch for fluidic control circuits comprising a switch housing, a module affixed to said housing containing at least one fluidic gate; a plurality of ports for said gate; vent means associated with one of said ports; a closure movable in said housing for blocking said vent means; and an operator for actuating said closure; said switch further comprising means adapted to provide the operator with an amount of over-travel after the closure blocks said vent means.

3,614,964
CLOCK PULSE GENERATING SYSTEM
Tsu-Fang Chen, Plymouth Meeting, Pa., assignor to Sperry Rand Corporation, New York, N.Y.
Filed Sept. 16, 1969, Ser. No. 858,260
Int. Cl. F15c *1/08*
U.S. Cl. 137—81.5 **5 Claims**



A plurality of high frequency pure fluid oscillators are interconnected to form a high frequency clock pulse generating system. The interconnection is through a short delay duct which joins the control nozzles of adjacent oscillators together so as to phase synchronize the oscillators.

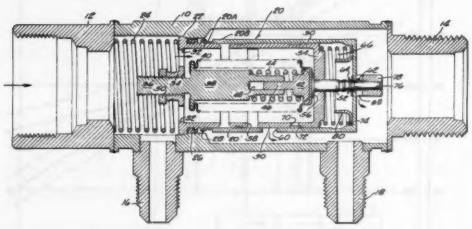
3,614,965
FIVE-PORT BISTABLE PNEUMATIC VALVE UNIT
Robert Metivier, 49 Rue du Docteur Blanche, Paris, France
Filed Oct. 22, 1969, Ser. No. 868,420
Claims priority, application France, Oct. 31, 1968, 172,192
Int. Cl. F15c *1/08*
U.S. Cl. 137—119 **7 Claims**



This five-port bistable pneumatic valve unit comprising a body in which an inlet port connected to a source of compressed gas, first and second outlet ports and first and second exhaust ports are formed, characterized in that it comprises a central feed chamber communicating with said inlet port and having a free valve member slidably mounted therein, first and second intermediate outlet chambers both connected on the one hand through first and second connecting passages to said central chamber, respectively, and on the other hand to said first and second outlet ports, respectively, and said first and second exhaust ports, respectively, first and second flap valves freely mounted in said first and second intermediate outlet chambers respectively for closing said first and second exhaust ports, first and second push members disposed externally of said first and second outlet chambers, respectively, and registering with said first and second exhaust ports so that they can project through said exhaust

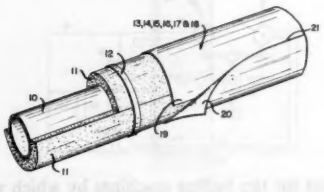
ports and unseat said exhaust port flap valves within said outlet chambers, and first and second devices for actuating said first and second push members respectively and unseat said first and second flap valves respectively.

3,614,966
PILOT OPERATED EVAPORATOR PRESSURE REGULATOR VALVE
Charles D. Orth, Cedarburg, Wis., assignor to Controls Company of America, Melrose Park, Ill.
Filed Nov. 13, 1969, Ser. No. 876,279
Int. Cl. F16k *17/10*
U.S. Cl. 137—489.3 **6 Claims**



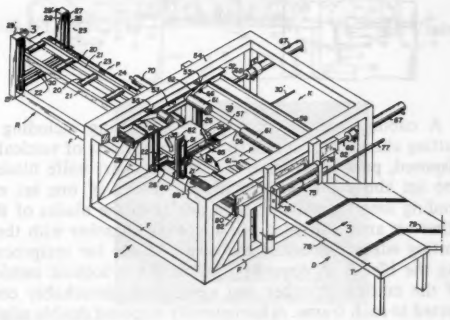
The interior of the bellows is sealed at atmospheric pressure so the pressure on the outside of the bellows is resisted by the atmospheric pressure within the bellows as well as by the spring. When the pressure on the outside of the bellows (which is evaporator pressure in a refrigeration system) exceeds a predetermined amount, the bellows tends to collapse and the head of the bellows pulls away from the actuating pin and allows the spring acting on the pilot valve to open the pilot valve whereupon the pressure to the right of the head of the piston is reduced, allowing the piston to move to the right against the return spring force and, thus, open the outlet by registering the port in the piston wall with the slot in the stationary sleeve. When the pressure falls below the desired amount, the bellows expands and moves the head of the bellows against the actuating pin to close the pilot valve. Leakage between the piston and sleeve to the pilot valve chamber rapidly raises the pressure therein so that the return spring can move the piston to close the outlet. Even with the outlet closed, the slight clearance between the piston and sleeve allows some refrigerant flow to insure adequate flow to the compressor to keep the compressor lubricated.

3,614,967
MULTILAYERED PIPE COATINGS AND COATED PIPE
John H. Royston, Pittsburgh, Pa., assignor to Royston Laboratories, Inc.
Filed Oct. 8, 1968, Ser. No. 765,836
Int. Cl. B32b *3/30;* **F16l** *57/00, 59/02*
U.S. Cl. 138—141 **10 Claims**



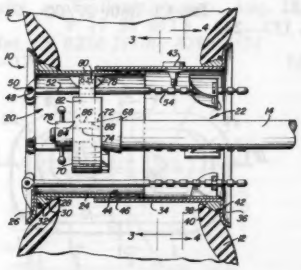
A pipe coating, a coated pipe and method of forming such coated pipe are disclosed wherein the pipe is surrounded by preformed insulation such as glass foam and the insulation is surrounded by a mat made up of a first layer of heat softening resin, a surrounding layer of woven glass fabric, a second layer of said resin, a layer of conductive foil, a third layer of said resin and an outer layer of water impervious plastic film, said mat being placed with overlapping edges which are heat sealed together.

3,614,968
APPARATUS FOR SLICING LUMBER
John R. Hirz, 1233 S. Bryon, Fort Collins, Colo. 80521
Filed Sept. 8, 1969, Ser. No. 856,101
Int. Cl. B27l *5/06*
U.S. Cl. 144—178 **7 Claims**



An apparatus and method for slicing slabs from a cant wherein the slice is effected by two opposing knives with one knife being adapted to move halfway into the cant from one side thereof, and the other knife adapted to be moved halfway into the cant from the other side thereof. With this operation, the knives will not lift the grain of the wood as they slice into the cant.

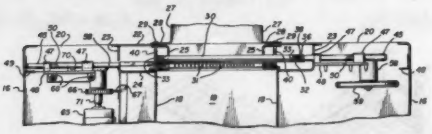
3,614,969
TIRE RECAPPING RIM
Carl M. Breiner, 4101 S. 2nd St., Yakima, Wash. 98903
Filed Mar. 7, 1969, Ser. No. 805,327
Int. Cl. B29h *5/02*
U.S. Cl. 144—288 **4 Claims**



A rim assembly having two cylindrical rim sections retained in telescoping relation for mounting a tire in preparation of multiple recapping operations. The two rim sections are removably held together by means of a plurality of notched rods, each rod being secured at one end thereof to one rim section, the opposite ends thereof passing into the second rim section. Because the second ends of the rods are notches, they are engaged by detent means attached to the second rim section. When engagement of

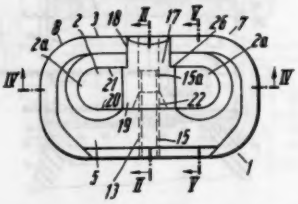
the rods and the detents is effected, the rim device may be mounted to a rotating shaft for multiple recapping operations. Means are provided for rapidly installing and removing a tire mounted rim assembly to a rotating shaft.

3,614,970
MEAT CUBING MACHINE
Rodger L. Webb, Englewood, and William A. Vaught, Denver, Colo., assignors to Denley Enterprises, Inc., Golden, Colo.
Filed Mar. 28, 1969, Ser. No. 811,402
Int. Cl. B02c *18/04*; B26d *4/02*
U.S. Cl. 146—78 A **8 Claims**



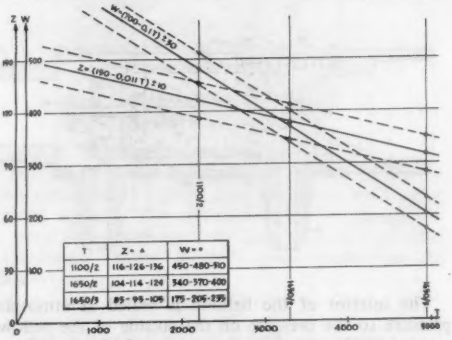
A cubing machine comprising a housing including a cutting chamber, first and second framed sets of vertically disposed, parallel, transversely spaced apart knife blades, one set above the other, with the blades of one set extending longitudinally at right angles to the blades of the other set and positioned in the cutting chamber with their cutting edges supporting the meat. Means for reciprocating the blades in opposite directions are located outside of the cutting chamber and operatively detachably connected to each frame. A horizontally disposed double edged blade, located between the framed sets, is provided with means for reciprocating the blade longitudinally and for moving the blade bodily across the cutting chamber in a horizontal plane through the meat. The blades are easily removable from their frames, and the frames are detachable from their reciprocating mechanisms. The reciprocating mechanisms for actuating the framed sets of blades and the cut-off blade comprise similar parts which reduce cost of production and facilitate assembly and detachment of parts.

3,614,971
CONNECTING LINK FOR TIRE CHAINS
Anton Muller, Unterkochen, Germany, assignor to Eisen- und Drahtwerk Erlau AG, Aalen, Wurttemberg, Germany
Filed May 16, 1969, Ser. No. 825,277
Claims priority, application Germany, May 18, 1968, P 17 55 529.2
Int. Cl. B60c *27/00*
U.S. Cl. 152—243 **25 Claims**



Connecting link for use in tire chains for connecting chain links together and consisting of a web-like body having an elongated aperature therein and a slot in one of the longer edges opening into the aperture and a closure member extending across the aperture and into the slot for confining chain links to the respective ends of the slot. A pin extending through a bore in the body and in the closure member detachably connects the closure member to the body.

3,614,972
PNEUMATIC TIRE
Werner Görter, Baden, Austria, assignor to Semperit Osterreichisch-Amerikanische Gummiwerke Aktiengesellschaft, Vienna, Austria
Filed Apr. 7, 1969, Ser. No. 822,813
Claims priority, application Austria, April 10, 1968, A 3,513/68
Int. Cl. B60c *9/04*
U.S. Cl. 152—356 **2 Claims**



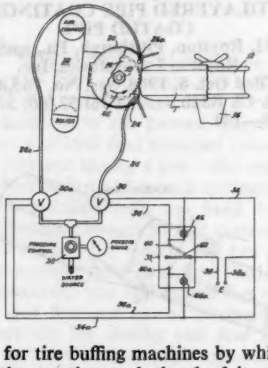
A pneumatic tire provided with reinforcing tire cords of twisted textile threads wherein the total twist of the threads W is given by:

$$W=(700-0.1T)\pm 30$$

where T is the total denier of the cord, and the number of threads Z per 10 cm. measured at the crown of the tire perpendicular to the cords is given by:

$$Z=(150-0.011T)\pm 10$$

3,614,973
TIRE CASING CONDITIONING MEANS AND METHOD
Wayne E. Jensen, Homewood, and George B. Davison, Glenwood, Ill.; said George B. Davison assignor to B & J Manufacturing Company, Glenwood, Ill.
Filed July 30, 1969, Ser. No. 846,160
Int. Cl. B29h *21/08*
U.S. Cl. 157—13 **13 Claims**



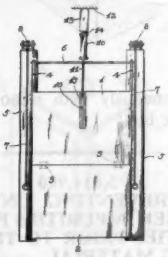
Attachment for tire buffing machines by which water is sprayed onto the rotating tool ahead of its engagement with the tire to cool the tool and reduce emission of smoke during the action of the tool on the tire.

3,614,974

DEVICE FOR AUTOMATICALLY OPENING AND CLOSING A SWING DOOR AND A SEALING DEVICE FOR THE SWING DOOR

Shigeru Tajima, 40–11, 5-chome, Nakano, Nakano-ku, Tokyo, Japan

Filed Nov. 4, 1969, Ser. No. 873,845
Claims priority, application Japan, May 9, 1969, 44/42,002; July 11, 1969, 44/65,704
Int. Cl. E05f *11/54*
U.S. Cl. 160—188 2 Claims



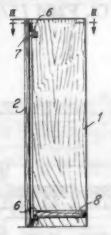
A device for automatically opening and closing a swing door in which an upper door member and a lower door member are hingedly connected to each other at an intermediate part of the swing door, and said upper door member is pivotally supported at an upper portion by a frame disposed on opposite sides of the swing door. A door opening and closing cylinder is supported above and in front of said upper door member and a piston rod received in said cylinder, is firmly secured at its forward end to the central portion of the upper door member. Actuation of the cylinder automatically moves the upper door member to hingedly connected lower door member in swinging motion whereby the swing door can be opened and closed. A sealing device for said swing door comprises a sealing cylinder firmly secured to the central portion of the upper door member and receiving therein a piston rod which supports at its forward end a clamping bar. Actuation of the sealing cylinder causes the clamping bar to press the upper door member and lower door member against the frame so as thereby to maintain an airtight seal therebetween.

3,614,975

FOLDING DOORS

Gilbert Emile Fulbert Aymond, 89 Faubourg Saint-Antoine, Paris, France

Filed Feb. 5, 1969, Ser. No. 796,698
Claims priority, application France, Feb. 6, 1968, 138,789
Int. Cl. E05d *15/26*
U.S. Cl. 160—206 8 Claims



A guided folding-door comprises two hinged panels, one of which is pivotally mounted and the other has its upper and lower portions equipped with parts which slide in slideways on horizontal transverse elements extending over the entire width of the door, said sliding parts being fixed to the rear side of the panel in such manner as not to project beyond the edge thereof, said transverse elements being positioned behind the door, and said slideways being located in the lower and upper faces of said transverse element in respect of said lower and upper parts respectively.

3,614,976

ROTARY METHOD OF CASTING

Gustaf F. Bolling and Gerald S. Cole, Dearborn, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Sept. 13, 1968, Ser. No. 760,126
Int. Cl. B22d *27/08*
U.S. Cl. 164—122 2 Claims

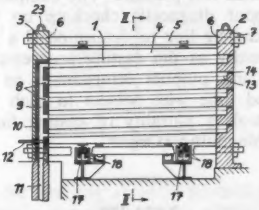
Rotating a casting during solidification at a constant rate sufficient to inhibit convective flow in the solidifying metal to produce columnar grain structure and subsequently at an angular acceleration sufficient to inhibit the formation of a columnar structure in the solidifying metal and produce an equiaxed grain structure.

3,614,977

CASTING METHOD AND MOLD WITH CAVITY PORTIONS IN END WALLS

Yasar Karabek, Blecher, Germany, assignor to Schloemann Aktiengesellschaft, Dusseldorf, Germany

Filed Aug. 18, 1969, Ser. No. 850,970
Claims priority, application Germany, Aug. 28, 1968, P 17 58 882.8
Int. Cl. B22d *29/00*; B28b *7/24*
U.S. Cl. 164—129 13 Claims



In particular when casting small metal billets, an improved method of casting and handling the cast product is provided by use of a mould having a number of casting chambers formed by two end walls and preferably two removable side walls. Grooves in the side walls register

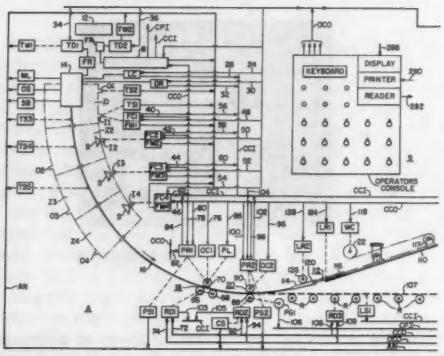
to provide a channel which registers with corresponding recesses in the end walls, so that after casting the side walls are removed leaving the rigid cast members supported by the end walls. An inlet duct is provided in one end wall, and the end walls are connected rigidly by preferably two spacers, so that the end walls, spacers and cast members can easily be removed for further processing such as cooling.

3,614,978

COMPUTERIZED CONTINUOUS CASTING SYSTEM CONTROL RESPONSIVE TO STRAND POSITION

Michael A. Kosco, East McKeesport, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 1, 1968, Ser. No. 741,567
Int. Cl. B22d *11/12*
U.S. Cl. 164—154 **16 Claims**



Computer controlled continuous casting of materials from the molten to the solid state. The computer keeps tracks of the position of the moving cast strand of each of a plurality of casting lines from the time it emerges from the mold and, in response to position of the strand, controls various elements at the proper time along the casting line, such as coolant flow, pinch rolls, straightening roller, dummy bar head separation, table or conveyor rolls, and slab cutting machine. The computer keeps track of the slab cutting machine and the position of its cutting elements, and controls the cutting operation in synchronism with movement of the strand. Also in response to position of the moving strand, the computer at appropriate times begins to monitor and compare against stored references such conditions as coolant and strand temperatures, coolant flow rates, pinch roll drive current, and pinch roll pressure. The computer also performs a pre-pour diagnostic check-up on various elements of the casting line to determine if a malfunction exists. Additionally as the casting progresses, the computer gathers and outputs information as a function of position and time with respect to each strand. The computer controls a plurality of casting lines in "parallel" by suitable multiplexing.

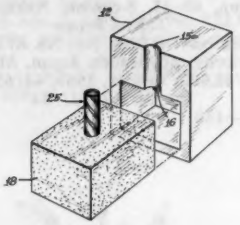
3,614,979

CORE BOX BLOW HOLE LINER

Donald H. Pikey, Chicago, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed July 29, 1969, Ser. No. 845,805
Int. Cl. B22c *15/24*
U.S. Cl. 164—228 **6 Claims**

A liner for the blow hole of a sand core box in the form of a wax-impregnated or coated paper tube wherein the wax acts as a release agent as it melts during the core-making operation to facilitate stripping of the blow



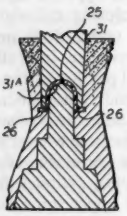
hole stool simultaneously with removal of the finished core from the core box.

3,614,980

MEANS FOR PREVENTING UNWANTED SAND, DIRT OR OTHER IMPURITIES FROM ENTERING MOLD CAVITIES PRIOR TO THE POURING OF THE CASTING MATERIAL

Roy C. Lander, Indianapolis, Ind., assignor to International Harvester Company, Chicago, Ill.

Filed May 23, 1969, Ser. No. 827,208
Int. Cl. B22c *21/00*
U.S. Cl. 164—374 **6 Claims**



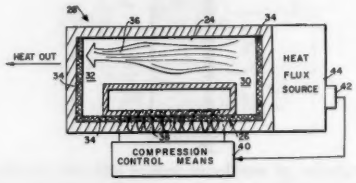
A stopper positionable within an open riser of a casting mold during the mold-forming operation which is capable of preventing loose sand, dirt or other impurities from entering the mold cavity prior to the metal pouring operation. The stopper is made of material consumable upon subjection to heat of the material being poured as it rises in the mold cavity.

3,614,981

DUAL TUBE HEAT PIPE AND MEANS FOR CONTROL THEREOF

John B. Coleman, Buffalo, and James P. Welsh, Snyder, N.Y., assignors to Sanders Associates, Inc., Nashua, N.H.

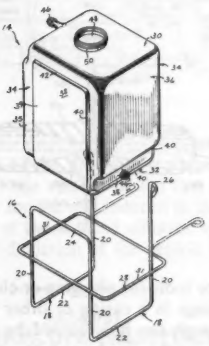
Filed Oct. 8, 1969, Ser. No. 864,677
Int. Cl. F28d *15/00*
U.S. Cl. 165—32 **5 Claims**



A dual tube heat pipe comprises a heat pipe wherein vapor flow from the evaporator to the condenser and the

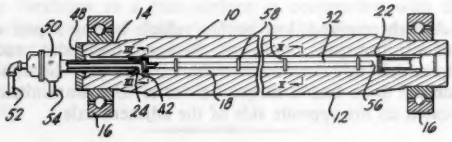
condensate return flow through a capillary structure are contained in separate and distinct tubes independent of one another. Means may also be provided for varying the condensate capillary flow rate by controlling the effective area of the capillary structure.

3,614,982
COOLING SYSTEM
John M. Krizman, 2502 W. Lawton, South Bend, Ind. 46628
Filed Sept. 22, 1969, Ser. No. 859,987
Int. Cl. F01p *11/02*
U.S. Cl. 165—51 5 Claims



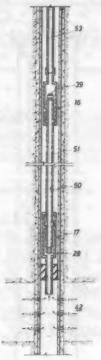
An improvement to a cooling system which includes a radiator for the circulation of a liquid coolant therethrough and a coolant receptacle connected to the overflow outlet of the radiator. The improvement concerns a flexible shape-retaining wire holder which is attached to a support adjacent the radiator and which includes two generally parallel oppositely spaced U-shaped wire brackets. The coolant receptacle is seated within the wire holder and includes protruding side and bottom wall portions which are straddled by the U-shaped brackets of the holder.

3,614,983
INTERNAL SMALL BORE ROLL SYPHON
Donald L. Calkins, Three Rivers, Mich., assignor to The Johnson Corporation, Three Rivers, Mich.
Filed Apr. 9, 1969, Ser. No. 814,677
Int. Cl. F28d *11/02*
U.S. Cl. 165—89 8 Claims



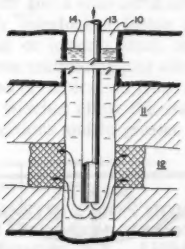
A syphon system for use with rotary heat exchanging rolls having a relatively small axial bore in which the heat exchanging medium is introduced and removed in order to heat or cool the roll. The medium removing apparatus is primarily mounted interiorly of the roll having conduits extending from one end of the bore. The heat exchanging medium is removed circumferentially about the inner surface of the bore, and the syphon system includes conduits for both introducing and removing the heat exchanging medium from the roll bore.

3,614,984
APPARATUS FOR COMPLETING WELLS TRAVERSING EARTH FORMATIONS
Argie J. Schexnaider, New Orleans, La., assignor to Schlumberger Technology Corporation, New York, N.Y.
Filed Mar. 2, 1970, Ser. No. 15,544
Int. Cl. E21b *21/00, 37/00*
U.S. Cl. 166—152 14 Claims



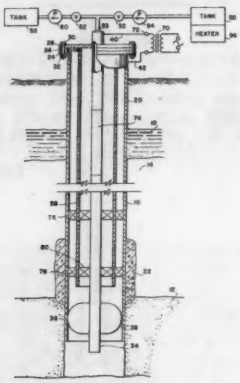
This application discloses new and improved apparatus for completing wells having earth formations which are to be fractured, acidized, or treated for inhibiting the production of unconsolidated formation materials. In the preferred embodiment of the present invention disclosed herein, a new and improved string of well tools is arranged for suspension from a string of pipe and includes a well packer coupled to an elongated tubular member defining an enclosed chamber of a substantial volume and which is maintained at a reduced pressure by first and second normally-closed valves operatively arranged at opposite ends of the member to be selectively opened at successive time intervals for quickly admitting fluids into the enclosed chamber.

3,614,985
PLUGGING A SUBTERRANEAN FORMATION BY HOMOGENEOUS SOLUTION PRECIPITATION
Edwin A. Richardson, Houston, Tex., assignor to Shell Oil Company, New York, N.Y.
Filed Mar. 30, 1970, Ser. No. 23,550
Int. Cl. E21b *33/138*
U.S. Cl. 166—294 10 Claims



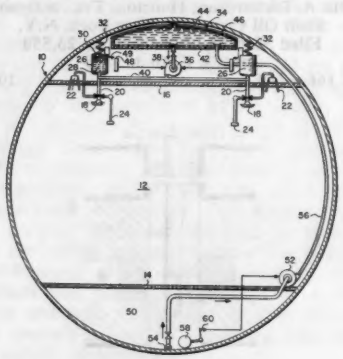
A process for plugging an earth formation by injecting fluid that forms a plugging material within the formation is improved by injecting an aqueous solution containing both a dissolved salt of a metal that precipitates as a gelatinous, hydrous or hydrated metal oxide or hydroxide at a pH higher than that of the solution and a dissolved material that reacts within the solution and raises the pH of the solution.

3,614,986
METHOD FOR INJECTING HEATED FLUIDS INTO MINERAL BEARING FORMATIONS
William G. Gill, Corpus Christi, Tex., assignor to The Electrothermic Co., Corpus Christi, Tex.
Filed Mar. 3, 1969, Ser. No. 803,533
Int. Cl. E21b *43/24*
U.S. Cl. 166—303 **6 Claims**



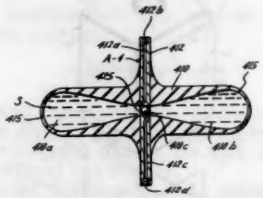
Heated fluids are injected into mineral bearing formations while flowing electrical current through tubing through which the fluids are injected at a rate to produce heat in the tubing sufficient to prevent loss of heat by the fluids while moving through the tubing.

3,614,987
FIRE PROTECTION SYSTEM FOR VARIABLE PRESSURE CHAMBERS
Ulrich Bonne, Hopkins, Minn., and Joseph L. Buckley, Arlington, Mass., assignors to Factory Mutual Research Corporation, Norwood, Mass.
Filed Mar. 24, 1969, Ser. No. 809,515
Int. Cl. A62c *35/00*
U.S. Cl. 169—2 **15 Claims**



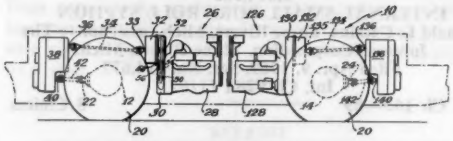
A fire protection system for sealed chambers of the type found in such vehicles as diving bells, spaceships and the like wherein variations in ambient pressure occur. The system employs fixed sprinkler heads, each with its own reservoir for extinguishing agent to ensure an initial, instantaneous supply of agent upon actuation of the respective sprinkler heads. The head reservoirs include a pressure transmitting means together with an agent expelling means so that the agent therein is always under a pressure in excess of ambient pressure. The head reservoirs are supplied with agent from a main storage reservoir. Also an agent run-off is collected in a sump and returned to the storage reservoir to conserve agent and avoid flooding.

3,614,988
DIFFERENTIAL PRESSURE TOOLS FOR PLUGGING HOLES IN WELL PIPE
Lawrence K. Moore, 3716 Ingold, Houston, Tex. 77005
Filed July 30, 1969, Ser. No. 846,203
Int. Cl. E21b *33/13*
U.S. Cl. 166—193 **15 Claims**



Apparatus or tools for plugging or closing holes, cracks, or other openings in a casing or other well pipe, wherein fluid flow through the hole caused by a differential fluid pressure between the inside and the outside of the pipe is utilized for seating the apparatus over the opening, and for introducing closure material through the opening for forming a plug or closure therefor.

3,614,989
DRIVE TRAIN FOR LOW PROFILE VEHICLE
Edward A. Bott, Crystal Lake, and Robert G. Luft, Wildwood, Ill., assignors to International Harvester Company, Chicago, Ill.
Filed Feb. 4, 1969, Ser. No. 796,371
Int. Cl. B60k *5/08*
U.S. Cl. 180—44 R **13 Claims**

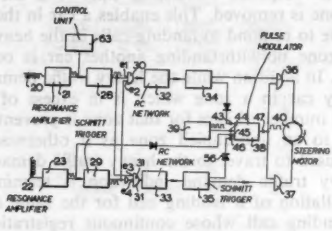


A high powered, low profile vehicle having a pair of engines arranged end-to-end between the axles, each engine drivingly connected to the adjacent axle through a transfer drive and a torque converter to a transmission located on the opposite side of the adjacent axle.

3,614,990
ELECTRICAL CONTROL ARRANGEMENT FOR STEERING OF VEHICLES
Gerhard Schnitzler, Gerlingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany
Filed Mar. 3, 1969, Ser. No. 804,061
Claims priority, application Germany, Mar. 2, 1968, P 16 13 991.6
Int. Cl. B62d *1/24*
U.S. Cl. 180—98 **17 Claims**

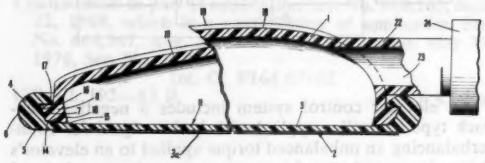
An electrical vehicle steering arrangement in which the vehicle is controlled to move along a predetermined

path. An electrical conductor stretched along the path is energized with alternating current of selected frequency. The conductor gives rise to an electromagnetic field which acts upon two coils mounted on the vehicle. One of these coils is arranged horizontally and transverse to the direction of motion of the vehicle, and is in proximity of the vehicle steering axle. The second coil is mounted in front



of the first coil in the direction of motion, and is arranged vertical to the axis of the first coil. Voltages are induced in the coils so that the voltage of the first coil serves as a reference voltage for the one induced in the second coil. The relative phase of the induced voltages within the coils is indicative of the deviation of the vehicle from the prescribed path.

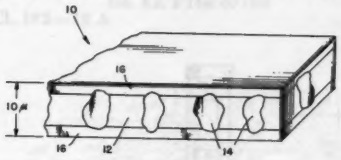
3,614,991
STETHOSCOPE CHESTPIECE
Gustav F. Machlup and David Littmann, Belmont, Mass., assignors to Minnesota Mining and Manufacturing Company, Maplewood Village, Ramsey County, Minn.
Filed Apr. 9, 1968, Ser. No. 719,927
Int. Cl. A61b *7/02*
U.S. Cl. 181—24 **7 Claims**



A stethoscope chestpiece construction including a diaphragm formed of a flat thin flexible resilient body having an integral angularly flared lip about its periphery adapted to snap over and engage a complementary shoulder in the body of the stethoscope head. An annular beveled section on the inner surface of the diaphragm body adjacent the lip functions as a cam surface in conjunction with the stethoscope head body to tension the diaphragm body across the head. The stethoscope head is formed of a thin plastic having reinforcing ribs on its outer surface and an integrally formed opening for attachment of a binaural tube.

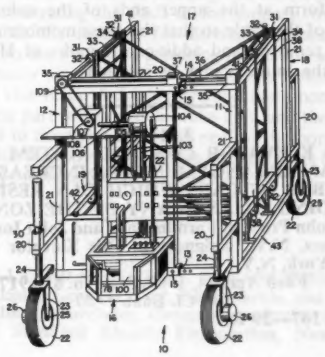
3,614,992
SANDWICH-TYPE ACOUSTIC MATERIAL IN A FLEXIBLE SHEET FORM
Harper John Whitehouse, Hacienda Heights, and Shelby F. Sullivan, Arcadia, Calif., assignors to the United States of America as represented by the Secretary of the Navy
Filed May 26, 1969, Ser. No. 827,578
Int. Cl. G10k *11/04;* **E04b** *1/84*
U.S. Cl. 181—33 G **8 Claims**

A sandwich-type, electro-mechanical, absorbing, acoustic material, in a flexible sheet form, comprising a thin sheet of elastomeric material within which are embedded particles having a size barely greater than the thickness of the elastomeric material. The particles may be of a transducer material, generally single-crystal, and/or of a



resistive material. Two conductive sheets, one on each side of the elastomeric material, which make contact with the embedded particles complete the sandwich.

3,614,993
AUTOMATIC SCAFFOLDING ERECTING AND DISMANTLING MACHINE
George N. Penso, 6637 Gatto Ave., El Cerrito, Calif. 94530
Filed Oct. 30, 1969, Ser. No. 872,503
Int. Cl. B65g *57/00;* **E04g** *1/14*
U.S. Cl. 182—16 **16 Claims**

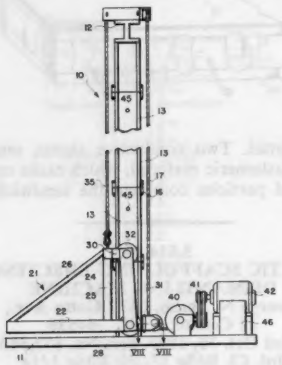


A machine for erecting and dismantling stacks of commercial scaffolding or shoring units includes an adjustable open-sided U-frame supported on four dirigible wheels which are vertically adjustable so the frame can automatically level itself and a semi-automatic elevator system with mechanically interlocked lifting hooks which will automatically raise or lower a stack of scaffolding units by an interval of one scaffolding unit whereby a scaffolding unit may be added or subtracted from the bottom of the stack. Stabilizing winches allow the stacks to be erected during windy conditions and to greater heights.

3,614,994
CONSTRUCTION HOIST
Samuel F. Goodrum, 918 Park Ave., Syracuse, N.Y. 13204
Filed Aug. 7, 1968, Ser. No. 750,936
Int. Cl. B66b *9/00*
U.S. Cl. 187—2 **4 Claims**

A hoist for raising and lowering equipment and materials at a construction site. Parallel columns made of lengths of H-beams are secured to a base or foundation and to the building at various intervals. A horizontal platform which is guided by the H-beams is also provided. The platform is provided with two pairs of flanged wheels for each H-beam column. The treads of the wheels ride

on the inner faces of the flanges of the beams while the wheel flanges run against the outer edge of the beam flanges when the platform is unevenly loaded. The platform is raised and lowered by a cable passing over a pulley carried on a vertical cross member joining the



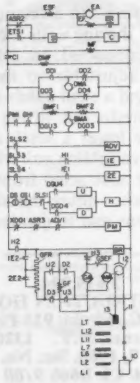
upper ends of the columns. Provision is made for locking the platform at the upper ends of the columns independent of the cable so that the cross member and pulley may be removed and additional lengths of H-beam extending the columns may be inserted.

3,614,995

ZONED ELEVATOR CONTROL SYSTEM INCLUDING AN ARRANGEMENT FOR INCREASING THE NUMBER OF CARS WHICH CAN RESPOND TO LANDING CALLS IN ANY OF THE ZONES

Alfred John Probert, Farmingdale, and John Joseph Faup, Yonkers, N.Y., assignors to Otis Elevator Company, New York, N.Y.

Filed Apr. 24, 1969, Ser. No. 818,917
Int. Cl. B66b *1/20*
U.S. Cl. 187—29 R **14 Claims**



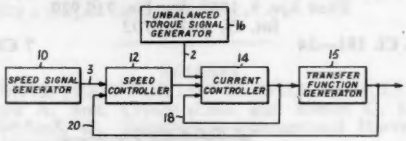
A zoned elevator control system for a group of cars in which the cars are distributed on a predetermined apportioned basis into various zones of the building, whereupon in the absence of calls each car is brought to a stop at a landing in the zone it is occupying. Thereafter in a zone occupied by a car the response to the first landing call is limited to a car located in that zone. A landing call in a zone in which no car is located starts a car located in the nearest lower zone. The level of traffic in each zone is measured individually. An up or a down landing call in registration in any zone continuously for a predetermined period without an up or a down landing call respectively being cancelled indicates the zone is a heavy demand zone. As a result the limitation on the response to landing calls to a car located in that zone is removed. This enables a car in the nearest lower zone to respond to landing calls in the heavy traffic demand zone notwithstanding another car is occupying that zone. In addition while the heavy traffic demand continues any car in a zone which is in excess of the apportioned number of cars for that zone is prevented from traveling to an unoccupied zone as it otherwise would and is caused to travel to the heavy traffic demand zone. The heavy traffic demand indication is terminated by the cancellation of a landing call for the same direction as the landing call whose continuous registration instituted the demand.

3,614,996

ELEVATOR CONTROL SYSTEM

Kenji Saito, Kunihiro Hattori, and Hiroshi Kamaike, Inazawa, and Hiroshi Sugimoto, Kobe, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 26, 1969, Ser. No. 880,165
Claims priority, application Japan, Nov. 29, 1968, 43/87,381
Int. Cl. B66b *1/30*
U.S. Cl. 187—29 R **18 Claims**



An elevator control system includes a negative feedback type controller applied with both a signal for counterbalancing an unbalanced torque applied to an elevator's drive circuit and stored in a memory, and a speed signal for an elevator car. The former signal is applied to the controller not only before the car starts but also after the speed signal has been applied to the controller. Thus the car is smoothly started without a discontinuity of signal level between both signals applied to the controller.

3,614,997

PLURAL CAR CONVEYOR SYSTEM CONTROLLED BY PERFORMANCE TIMES BETWEEN CARS

John Lusti, River Vale, N.J., assignor to Otis Elevator Company, New York, N.Y.

Continuation-in-part of application Ser. No. 866,417, Sept. 18, 1969, which is a continuation of application Ser. No. 664,434, Aug. 30, 1967. This application Dec. 16, 1969, Ser. No. 885,607
Int. Cl. B66b *1/20*
U.S. Cl. 187—29 **117 Claims**

An conveyor control system for a group of cars in which the cars respond to calls for service in accordance with the relationship between the work load of each individual car and the average of the work loads of all the cars in the group. The work load of a car preferably is expressed in terms of the performance time separating it from the car immediately ahead of it in a prescribed way of travel and is a function of both the distance between it and the car immediately ahead of it and the number of landings between them at which the car in question

will answer calls for service. If the work load of any car is less than the average the car immediately ahead of it is enabled to bypass without stopping at those landings at which it otherwise would in answer to calls. If the combined work loads of any one car and the car immediately behind it are less than the average, that one car is available and will operate to provide direct service to a selected one of the hall calls in registration.

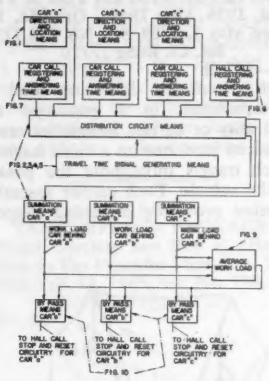

DISTRIBUTION CIRCUIT MEANS
TRAVEL TIME SIGNAL GENERATING MEANS
AVERAGE WORK LOAD
TO HALL CALL STOP AND RESET CIRCUITRY FOR CAR "A"
TO HALL CALL STOP AND RESET CIRCUITRY FOR CAR "B"
TO HALL CALL STOP AND RESET CIRCUITRY FOR CAR "C"

FIG. 10

3,614,998

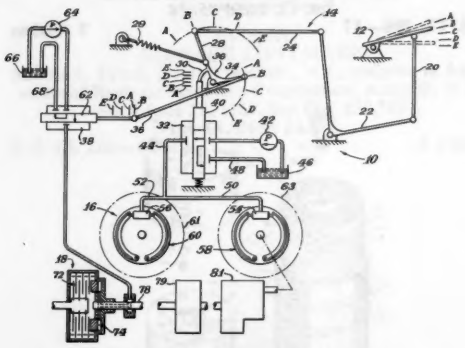
COMBINED CLUTCH AND BRAKE CONTROL SYSTEM FOR A VEHICLE

Kenneth E. Houtz, Streamwood, Ill., assignor to International Harvester Company, Chicago, Ill.

Continuation-in-part of application Ser. No. 860,105, Sept. 22, 1969, which is a continuation of application Ser. No. 664,347, Aug. 30, 1967. This application May 18, 1970, Ser. No. 38,093

Int. Cl. F16d 67/02

U.S. Cl. 192—13 R **6 Claims**



A control system for a vehicle having hydraulically operated brake and clutch mechanisms. A single control element provides simultaneous modulation of the brake and clutch pressures within the range between full brake application with clutch release, and brake release with full clutch release, and brake release with full clutch application. The control system is designed to provide fail safe operation.

3,614,999

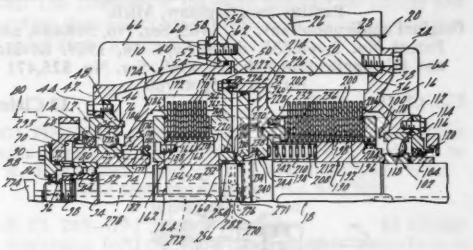
CLUTCH AND BRAKE WITH COOLING MEANS

Gordon M. Sommer, Grosse Point Woods, Mich., assignor to G. M. Sommer Co., Inc., Detroit, Mich.

Filed Mar. 6, 1969, Ser. No. 804,771

Int. Cl. F16d 67/04

U.S. Cl. 192—18 A **13 Claims**



A clutch-brake unit comprising a relatively fixedly mounted support structure, a drive shaft rotatable relative to the support structure, a housing rotatable relative to the support structure and at least partially surrounding the shaft, a brake within the housing and adapted for non-rotatably connecting the shaft to the support structure, a clutch within the housing for drivingly connecting the housing with the shaft, and actuating means for selectively simultaneously energizing the clutch and releasing the brake and vice versa. A driving flywheel has a bore therein surrounding part of the clutch-brake unit, and the housing is attached to the flywheel at one endi of the bore so that cooling fluid from the clutch-brake unit contacts the housing and bore surface for cooling the fluid.

3,615,000

TYPE LEVER SELECTION ARRANGEMENT

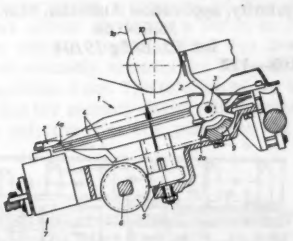
Folker Galaske, Gerhard Graf, Karl Merkle, and Helmut W. Schilling, Pforzheim, Germany, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Apr. 2, 1969, Ser. No. 812,636

Claims priority, application Germany, Apr. 27, 1968, P 17 61 288.3

Int. Cl. B41j 1/22

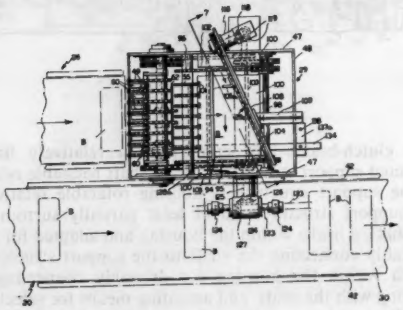
U.S. Cl. 197—18 **11 Claims**



An arrangement for selecting individual type levers intended to perform printing, from a plurality of adjacent type levers which are assembled to form a continuously rotating rim-shaped magazine. A mechanical selection is effected by a shooting magnet acting upon the upper free end of the type levers. The timing control for the magnet is determined by a pulse generator which is ar-

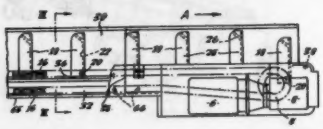
ranged in front of the magnet a predetermined distance to compensate for the time required for selection and reaction of a type lever.

3,615,001
HIGH SPEED TRANSFER SYSTEM
Hiram E. Temple, Saginaw, Mich., assignor to Baker Perkins Inc., Saginaw, Mich.
Original application Nov. 19, 1965, Ser. No. 508,684, now Patent No. 3,466,835, dated Sept. 16, 1969. Divided and this application Feb. 25, 1969, Ser. No. 825,471
Int. Cl. B65g *47/00*
U.S. Cl. 198—20 R **12 Claims**



A transfer machine for supplying a longitudinally forwardly moving main conveyor with products such as bread loaves wherein a sweep moving transversely to the conveyor moves bread loaves only to empty stations or spaces on the conveyor. Products such as bread loaves are fed only to empty stations on the main conveyor and the sweep is so timed with the movement of the advancing conveyor that the product is delivered to the empty station at precisely the time that the station passes a predetermined delivery location.

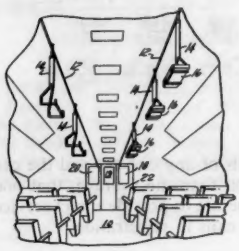
3,615,002
SCRAPER-CHAIN CONVEYORS
Robert B. Bolton, 14 Middle Drive, Ponteland Northumberland, England
Continuation-in-part of application Ser. No. 657,883, Aug. 2, 1967. This application Mar. 25, 1969, Ser. No. 810,095
Claims priority, application Australia, Mar. 27, 1968, 35,634/68
Int. Cl. B65g *19/04*
U.S. Cl. 198—170 **4 Claims**



A scraper chain conveyor of the single chain type has a trough to receive the material being conveyed, an endless chain passing round end sprockets, one run of which extends along one side of the trough, and a series of pivoted flights spaced along the chain, which flights are maintained transversely to the trough throughout the driving run, and assume a trailing attitude relative to their pivots during the return run.

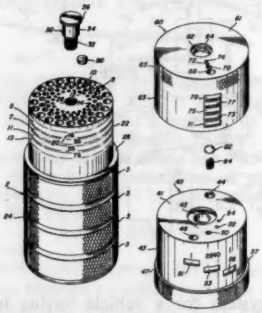
3,615,003
FOOD CONVEYOR SYSTEM FOR A VEHICLE
Jacob A. Rust, 1026 Alba Drive, Orlando, Fla. 32804
Filed May 1, 1969, Ser. No. 820,722
Int. Cl. B65g *17/20*
U.S. Cl. 198—177 R **2 Claims**

A conveyor system for delivering food trays to a passenger compartment in a passenger transporting vehicle. A plurality of carrier assemblies are removably mounted at spaced locations on a cable having an elastic covering which travels throughout the passenger compartment of the vehicle. Each carrier assembly includes a spring member providing a biasing support between



a cable engaging portion and a tray engaging portion of the carrier assembly thereby allowing relative movement between these two portions of the carrier assembly so as to prohibit displacement of the tray and proper orientation of the carrier assembly regardless of the attitude or change in position of the vehicle.

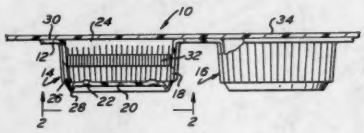
3,615,004
INDEXING DRILL CONTAINER
John L. Wescott, 3702 N. 48th Place, Phoenix, Ariz. 85018
Filed Apr. 6, 1970, Ser. No. 25,692
Int. Cl. B65d *85/24*
U.S. Cl. 206—17 **3 Claims**



A cylindrical container has a plurality of recesses longitudinally oriented along the perimeters of concentric circles disposed about the longitudinal axes of the cylinder. The recesses are sized and dimensioned to receive twist drills and similar tools in varying sizes. Two covers, the

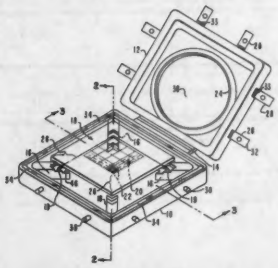
first fitting over the end of the cylinder in which the recesses are drilled and the second fitting over the first cover, are rotatably secured to the end of the cylinder. Index legends are scribed on the cylindrical surface of the cylinder adjacent the covered end. The two covers are provided with apertures so disposed that only one recess is open at a time, and the corresponding drill size legend in the index is visible on the side of the cylinder through registered windows in the sides of the covers. The visible index legend corresponds to the size drill stored in the corresponding recess. Detent means are also provided to hold the covers relative the cylinder in a closed position or in any one of a plurality of preselected open positions communicating with the various recesses in the cylinder.

3,615,005
TAMPERPROOF PACKAGE
Joseph M. Segel, Merion, and Roy E. Okell, Broomall, Pa., assignors to The Franklin Mint, Inc., Yeadon, Pa.
Filed Feb. 12, 1969, Ser. No. 798,715
Int. Cl. B65d *83/00*
U.S. Cl. 206—56 **9 Claims**



A tamperproof and easy-open package of polymeric plastic materials is disclosed wherein a base sheet is provided with specially designed receptacles integral therewith and defined by corrugated side walls with a sharp top edge and an end wall. A top sheet overlies the open end of the receptacle and is welded to a peripheral flange portion of the base sheet with the welds circumscribing the receptacles. When downward pressure is applied on the top of the receptacle, the end wall is pushed in, the receptacle ruptures at a weak section between the corrugated side wall and the end wall before the end wall makes contact with an article within the receptacle.

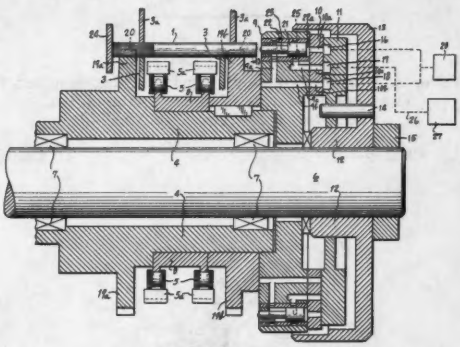
3,615,006
STORAGE CONTAINER
Morris S. Freed, North Plainfield, N.J., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed June 26, 1969, Ser. No. 836,701
Int. Cl. B65d *85/48*
U.S. Cl. 206—62 R **4 Claims**



A container for a plate, such as a glass mask used in the fabrication of microelectronic integrated circuit devices or other plate which is breakable or has a precision surface liable to damage by contact, having supports for the plate and a member integral to the container for biasing the plate against the supports is provided. The supports and biasing members apply substantially directly opposing forces at the periphery of the plate. The container protects such a glass mask or other plate against breakage or damage and allows rapid insertion or removal of the plate. The container is therefore adapted for storing and handling glass masks used for the high volume production of integrated circuits.

3,615,007
CONTINUOUS LOOSE END INSPECTION SYSTEM
Leslie Elmer Payne, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Co., Winston-Salem, N.C.
Filed Sept. 10, 1969, Ser. No. 856,700
Int. Cl. B07c *5/34*
U.S. Cl. 209—79 **12 Claims**

Apparatus for inspecting cigarette ends comprising a rotating drum having individual holders thereon for transporting cigarettes in a production line through an inspection station and inspecting means at each holder in form of a piston with a probe on its end which is forced against the adjacent end of a cigarette in the holder by a predetermined pneumatic pressure supplied at the inspection station which pressure is used to actuate a memory and reject system when the cigarette is found to be defective. If a cigarette end is loosely packed or foreshortened, the piston will be displaced beyond a predetermined distance,

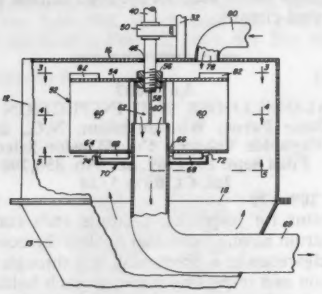


permitting the actuating pressure to be diverted into the memory-reject system displacing a piston in a drum located further along a conveyor chain that interrupts the travel on and positively removes the inspected cigarettes from the inspecting drum. The rotation of the latter drum is timed so that the memory device will actuate the reject means as a defective cigarette passes on the conveyor chain.

3,615,008
CENTRIFUGAL CLASSIFYING SYSTEM
Smith M. Alpha, St. Mary Parish, La., assignor to Silver Lining Inc., St. Mary Parish, La.
Filed Feb. 17, 1969, Ser. No. 799,569
Int. Cl. B07b *7/083*
U.S. Cl. 209—139 A **2 Claims**

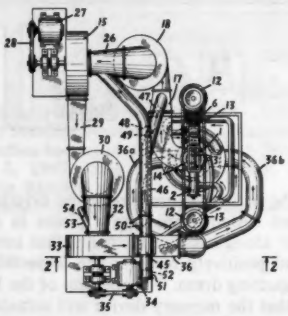
This disclosure relates to a centrifugal classifying, or particle separation, system wherein solid particles are admitted to a rotating distributor plate. Centrifugal force throws the particles off the plate radially outwardly toward the sides of a cylindrical housing, and thus into a

stream of air flowing upwardly and into a rejector mechanism. This mechanism is a cylindrical fan of the "squirrel cage" type, having a large number of vertically aligned blades around its circumference. Air is fed into the housing surrounding the rejector drum and flows through the blades to a discharge chamber located inside the rejector, carrying with it particles of the material



being thrown off the distributor plate. The size of the particle entrained in the air flow and carried into the discharge chamber will depend upon the rate of flow and upon the speed of rotation of the rejector blades. The particles not entrained and those prevented from passing through the rejector blades will fall to the bottom of the housing for removal, and in this manner the desired particles may be separated from the remainder.

3,615,009
CLASSIFYING SYSTEM
Walter J. Norton, Altamonte Springs, Fla., assignor to The Georgia Marble Company, Atlanta, Ga.
Filed Mar. 3, 1969, Ser. No. 803,740
Int. Cl. B07b *7/083, 7/10*
U.S. Cl. 209—139 A **10 Claims**

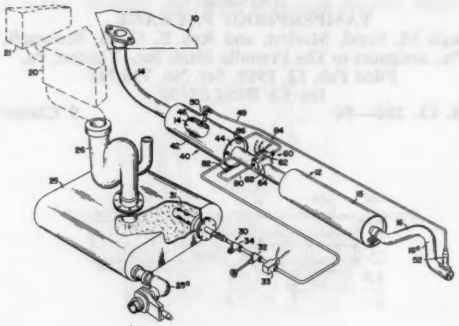


A classifying system of the type in which an air stream is recirculated through the system and in which finer particles are separated from coarser particles by being drawn through a particle separator which passes therethrough finer particles while rejecting coarser particles and including a centrifugal separator into which the finer particles are drawn with the stream of air and removed from the system, a first blower for maintaining the centrifugal separator under suction by removing air and ultrafine material therefrom, and a second blower for returning air to an air swirling chamber from which air passes in countercurrent fashion with the coarser particles to separate finer particles therefrom and return them to the particle separator.

ERRATA

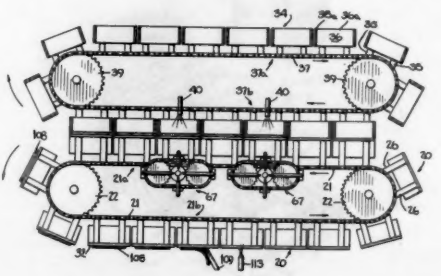
For Classes 209—211 and 209—349 see: Patent Nos. 3,615,014 and 3,615,021

3,615,010
WASTE DISPOSAL SYSTEM
James S. Reid, Hudson, and Harry W. Green, North Olmsted, Ohio, assignors to The Standard Products Company, Cleveland, Ohio
Continuation of application Ser. No. 668,867, Sept. 19, 1967. This application Feb. 2, 1970, Ser. No. 7,448
Int. Cl. B01d *1/14*
U.S. Cl. 210—65 **12 Claims**



A waste disposal system in which the exhaust system of a vehicular unit is employed to supply heat to a dissipatus drum in which liquid waste material is introduced. The flow of waste material into the drum is controlled by a pump actuated by a thermostatic pump control switch.

3,615,011
APPARATUS AND METHOD FOR CONTINUOUS FILTERING
William S. Eakins, St. Andrews Lane, Glen Cove, N.Y. 11542
Application Dec. 21, 1966, Ser. No. 613,691, now Patent No. 3,460,674, dated Aug. 12, 1969, which is a continuation-in-part of application Ser. No. 578,361, Sept. 9. 1966. Divided and this application July 30, 1969, Ser. No. 845,984
Int. Cl. B01d *25/22, 35/08*
U.S. Cl. 210—77 **21 Claims**



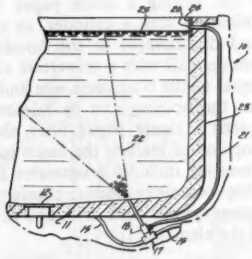
A traveling filter comprising a plurality of trays disposed to travel along a path, a plurality of frames adapted to travel along a second path and through a portion of said path mate with the trays to confine material thereon, and a plurality of conduit means adapted to travel along

a third path and adapted to be advanced and retracted to establish communication with and discharge liquid from said trays.

3,615,012
DEVICE FOR PURIFYING LIQUIDS, PARTICULARLY WATER
Andre Verbandt, 130 Parmentierlaan, Knokke, Belgium
Filed Oct. 7, 1969, Ser. No. 864,352
Claims priority, application Belgium, Oct. 9, 1968, 64,519; Sept. 26, 1969, 79,567
Int. Cl. B01d *35/16*
U.S. Cl. 210—159 **9 Claims**

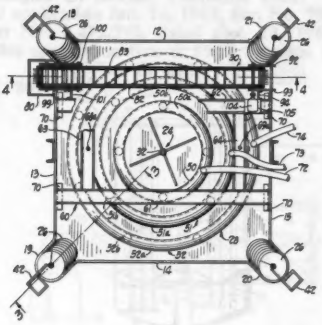
A device for removing floating debris from water running in a channel, including a grate of inclined parallel bars, two pairs of gear wheels, and two parallel continuous chains running over the gear wheels and extending longitudinally of the bars. The device includes drive means for rotating the gear wheels, and a horizontal beam having teeth affixed thereto which are adapted to engage between the bars of the grate in a raking position to carry solid impurities retained against the grate.

3,615,013
SWIMMING POOL APPARATUS
Wayne P. Reece, Orlando, Fla., assignor to Tropicana Pools, Inc., Orlando, Fla.
Filed July 17, 1969, Ser. No. 842,514
Int. Cl. E04h *3/20*
U.S. Cl. 210—169 **2 Claims**



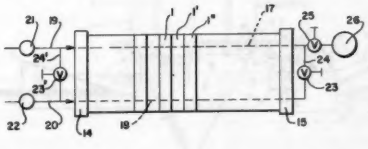
A swimming pool aerator apparatus for bubbling air into a swimming pool having a water line from the swimming pool filter system leading to one or more aspirator pumps connected to the bottom of a swimming pool for water to pass from the filter system through the aspirator pump into the swimming pool. An air line is connected from above the water level of the swimming pool down to the aspirator pump whereby water passing through the aspirator pump will draw air into admixture therewith which air will bubble through the water in the swimming pool. Several swimming pool aerators are connected in tandem with outputs angled into the pool bottom to provide for aeration of the water and agitation of the silt in the swimming pool, which silt may then be filtered through the filtering system.

3,615,014
METHOD OF AND APPARATUS FOR SOLID WASTE RECOVERY
Frank J. Hruby, 2809 County Road 18, Ravenna, Ohio 44266
Filed Jan. 21, 1970, Ser. No. 4,690
Int. Cl. B04b *5/12*
U.S. Cl. 209—211 **17 Claims**



Solid waste, especially household scrap, is separated into component substances on the basis of their relative densities by entraining the waste in a liquid and swirling the liquid and waste in a vessel having a peripheral side will with one or more corner portions. The heaviest component substances are collected in the corner portions of the vessel and other solid waste still entrained in the liquid is removed at locations inwardly of the side wall. In a preferred embodiment, a rotor is located centrally of a square vessel to swirl liquid and waste. Collecting members, preferably of a conveyor type, are located in the corner portions of the vessel to collect and remove the heavier waste and suction conduits are inserted into the vessel inwardly of the side wall at particular radial distances from the center of the vessel to remove entrained waste of different densities. The vessel is provided with an upwardly convex bottom wall and a skimmer at the top for removing floating waste.

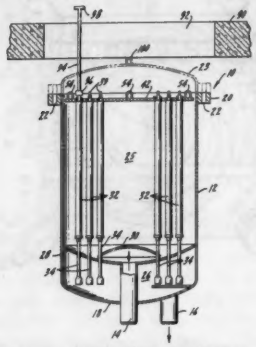
3,615,015
FILTER PRESS
Oswald Busse and Hugo Klesper, Michelbach, Germany, assignors to Passavant Werke, Michelbacherhutte, Germany
Filed Oct. 23, 1969, Ser. No. 868,792
Claims priority, application Germany, Oct. 29, 1968, P 18 05 893.0
Int. Cl. B01d *25/12*
U.S. Cl. 210—231 **12 Claims**



A filter press wherein the effective filtering area may be enlarged by the construction whereby the space between adjacent filter plates is sub-divided into chambers,

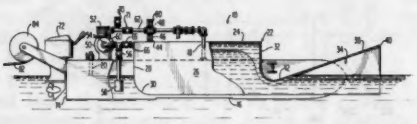
each isolated from each other but in fluid communication with corresponding chambers in the spaces between adjacent filter plates. A separate fluid conveyance device may be provided for each group of connected chambers.

3,615,016
FILTER TANK HAVING REPLACEABLE FILTER CARTRIDGES
Alfonse J. Soriente, Gillette, N.J., and Stanley H. Wapner, New York, N.Y., assignors to Ecodyne Corporation, Chicago, Ill.
Filed Oct. 3, 1968, Ser. No. 764,874
Int. Cl. B01d *25/02*
U.S. Cl. 210—232 **17 Claims**



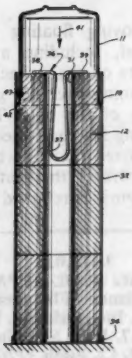
Apparatus enabling remote removal of a plurality of annular filter cartridges from a tank includes a wrenching portion on top of each cartridge, enabling it to be easily turned and unseated by an operator outside the tank. A cartridge locating plate having a plurality of apertures is positioned to fit over the wrenching portions, while permitting them to be rotated. Each wrenching portion includes release means which prevent the cartridge from dropping from the plate, so that the plate and cartridges may be lifted together and removed from the tank. The release means permit the easy removal of the cartridges from the plate after removal from the tank. The filter cartridges may be screw-mounted on the seat means, or novel mounting means may be employed. These novel mounting means include a cartridge receiver on top of the seat means, and having a cam slot, together with upwardly biased cam follower means on the bottom of the filter cartridge.

3,615,017
OIL ENTRAPMENT AND CONTAINMENT WATERCRAFT
Joe M. Valdespino, 5023 Golf Club Parkway, Orlando, Fla. 32808
Filed Dec. 15, 1969, Ser. No. 884,899
Int. Cl. E02b *15/04*
U.S. Cl. 210—242 **10 Claims**



An oil slick entrapment and containment watercraft has a pair of pontoons buoyantly supporting an open-bottomed entrapment tower and a funnel-shaped surface skimming shroud. The open bottom of the entrapment tower is below the water level; and, as the craft moves on the water having an oil slick, the oil passes into the skimmer and into the entrapment tower where the column of liquid is raised by vacuum applied to the top of the entrapment tower. Oil rises to the top of the water in the entrapment tower due to the difference in specific gravity and without emulsifying and is then pumped off the top. A single pump carried by the craft is connected by suitable piping arrangements and provides multiple functions including; drawing vacuum in the entrapment tower by aspirating air from the entrapment tower through an aspirator, supplying air to the pontoons, and pumping the oil from the entrapment tower. The buoyancy of the pontoons is controlled by supplying air and water to the top of the pontoons allowing the water to escape out of a slot in the botom of the pontoons and providing air purge lines in the pontoons.

3,615,018
METHOD AND APPARATUS FOR PLACING FILTER ELEMENT IN HOUSING
Lloyd R. Johnson, Tracy, Minn. 54617
Continuation of application Ser. No. 818,981, Apr. 24, 1969. This application Feb. 19, 1970, Ser. No. 12,868
Int. Cl. B01d
U.S. Cl. 210—232 **11 Claims**

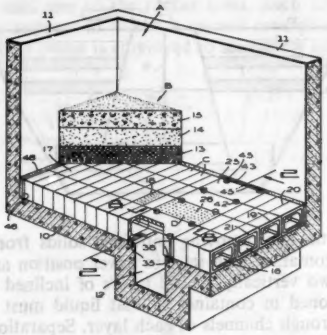


A container for storing a tissue paper filter element usable in combination with a cylinder, as an oil cleaner housing, to load the element in the housing. The container has an inside wall with a transverse size and shape substantially equal to the transverse size and shape of the housing so that the housing can be telescoped into the container to place a tissue paper filter element in the housing. The method of loading the tissue paper filter element into the housing includes progressive feeding of the housing into the container and circumferentially compressing the tissue paper filter element as the housing telescopes over the element.

3,615,019
UNDERDRAIN SYSTEM FOR WATER FILTRATION PLANT
Fred J. Early, Jr., 369 Pine St., San Francisco, Calif. 94104
Filed Aug. 13, 1970, Ser. No. 63,481
Int. Cl. B01d *23/18*
U.S. Cl. 210—293 **12 Claims**

An underdrain system for water filtration plant, wherein a filter basin has a floor and upwardly-extending walls rising therefrom to define a crib for holding filter media, the basin having a gullet in its floor. Rows of underdrain

blocks are provided on the floor and adjacent underdrain blocks are end-abutted with compressed sealing rings being interposed therebetween to form water-tight joints. Moreover, a row of gullet blocks are centered over the gullet, and these blocks are side-abutted, with compressed rings being arranged between the sides of adjacent gullet blocks to form water-tight joints. The latter sealing rings



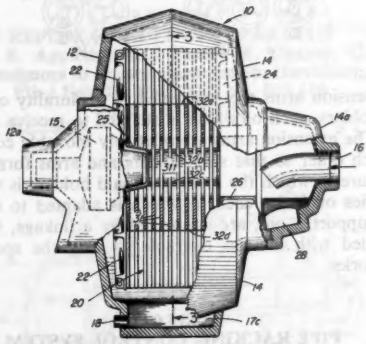
extend between the floor of the filter basin and the bottoms of the gullet blocks to provide water-tight joints. Both types of blocks define water passageways in their interiors, and all of the abovementioned blocks have top walls formed with holes therein, whereby filtered water may flow from the filter media to the gullet, and backwash water may be conveyed from the gullet to and through the filter media in a reverse direction to clean the media.

3,615,020

APPARATUS FOR SEPARATION AND FRACTIONATION OF MATERIAL SUSPENDED IN A LIQUID

Gunnar Olgard, Nynashamn, Sweden, assignor to Rederiaktiebolaget Nordstjernan

Filed Oct. 6, 1969, Ser. No. 863,847
Claims priority, application Sweden, Oct. 7, 1968, 13,497/68
Int. Cl. B01d *43/00*
U.S. Cl. 210—322 **17 Claims**



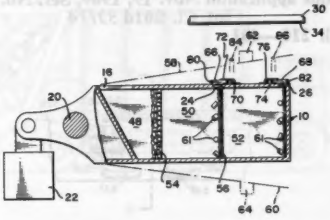
Apparatus for separation and fractionation of material suspended in a liquid has a plurality of helical passageways, preferably in flat spiral form, concentrically mounted as a unit which is rotated to pick up plugs of liquid and another phase alternately and discharge the liquid plugs into separate receivers. Identical units are mounted side by side as an assembly with all discharging into the same receivers. The cross sectional area of the passageway is reduced from inlet to outlet, preferably regularly and continuously, to improve the tendency of particles of larger size to concentrate progressively at the front end of the liquid plug. The area reduction may also be by abrupt narrowing as by a longitudinal partition placed in the passageway part way along its length.

3,615,021

SCREEN PARTICLE SEPARATOR

T. O. Paine, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Douglas G. Ritchie, Pasadena, Calif.

Original application Jan. 24, 1968, Ser. No. 700,120, now Patent No. 3,472,372, dated Oct. 14, 1969. Divided and this application Oct. 6, 1969, Ser. No. 864,039
Int. Cl. B07b *1/28*
U.S. Cl. 209—349 **1 Claim**



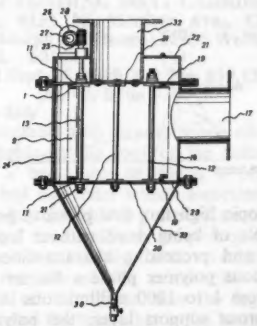
A mechanism useful in an unmanned spacecraft for screening a soil sample to obtain particles for television viewing. The mechanism comprises a bin for receiving the soil sample, apparatus for rapidly oscillating the bin about a pivot to create centrifugal forces pushing the soil particles through coarse and fine screens, a heated plastic sheet for receiving particles thrown out of the bin, and a translating mechanism for carrying the plastic to a vidicon tube for television observation of the particles. The translating mechanism includes slides which move along rods, each rod hermetically enclosed within a bellows to prevent the evaporation of lubricants when operated in a vacuum environment such as exists on the moon.

3,615,022

FILTER ELEMENT ASSEMBLY IN THE FORM OF AN ENDLESS LOOP AND THE PROCESS FOR FABRICATING THE SAME

Tadashi Hagihara, 4–1 Nagasaki Minami 5-chome, Toshima-ku, Tokyo, Japan

Filed Feb. 11, 1970, Ser. No. 10,482
Int. Cl. B01d *25/18*
U.S. Cl. 210—357 **3 Claims**



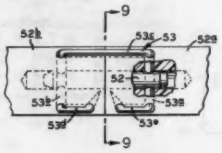
A self-reactivation-type filter element assembly comprising a plurality of filter element units each including

a plurality of filter pieces interconnected to each other in partially overlapping relation for relative movement and adapted to rotate about its own axis along a polygonal path within a filter. Each of said filter pieces comprises a sector or narrower elongated portion provided with an acute projection at one end and an integral elongated shank or wider elongated portion provided with through bores at the opposite ends. Pins extend through the aligned bores in one end of the shank or wider portion of one filter piece and in the other end of another filter piece which are in partially overlapped relation.

3,615,023
CENTERING DEVICES FOR ENDLESS FILTER BELT

August C. Barnebl, Stamford, and Franz Bliem and Ernst R. Kus, Norwalk, Conn., assignors to Dorr-Oliver Incorporated, Stamford, Conn.

Original application Jan. 25, 1968, Ser. No. 700,579, now Patent No. 3,503,517, dated Mar. 31, 1970. Divided and this application Nov. 19, 1969, Ser. No. 870,551
Int. Cl. B01d *33/14*
U.S. Cl. 210—401 **3 Claims**

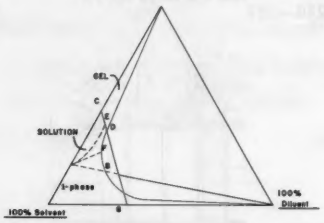


A pair of opposedly arranged belt centering devices for belt type vacuum drum filter apparatus, engaging respective side edge portions of the filter belt, each such device featuring a pair of glide shoes slidably engaging opposedly arranged tracks on the filter belt, the devices themselves being biased away from each other and from the side edges of the belt so that between them they exert a transverse stretch upon the filter media, also featuring specially molded flexible strip elements providing the tracks at the edges of the belt, and connector means for securing the ends of the strip to one another.

3,615,024
HIGH FLOW MEMBRANE

Alan S. Michaels, Lexington, Mass., assignor to Amicon Corporation, Lexington, Mass.

Continuation-in-part of application Ser. No. 669,648, Sept. 21, 1967. This application Aug. 26, 1968, Ser. No. 755,320
Int. Cl. B01d *13/00, 39/00*
U.S. Cl. 210—490 **6 Claims**

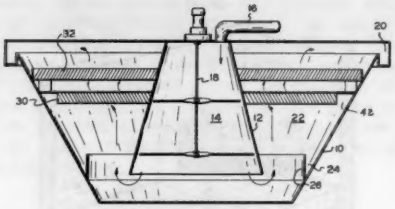


An anistropic high flux low pressure polymeric membrane capable of being dried without loss of beneficial mechanical and processing characteristics, and having in a continuous polymer phase a barrier layer containing pores from 1 to 1000 millimicrons in diameter and an open porous support layer, the polymer absorbing less than 10 percent moisture at 100 percent relative humidity at 25° C.

3,615,025
SOLIDS-LIQUID SEPARATOR WITH VERTICALLY SPACED TUBE-SETTLERS

Archie H. Rice and Curtis E. McCann, Corvallis, Oreg., assignors to Neptune Microfloc, Incorporated, Corvallis, Oreg.

Filed Dec. 19, 1969, Ser. No. 886,680
Int. Cl. B01d *21/02, 21/24*
U.S. Cl. 210—521 **8 Claims**

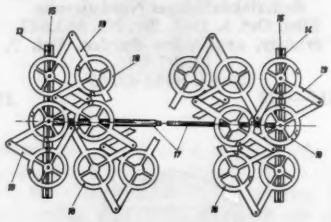


Apparatus for removing entrained solids from liquids includes container with inlet in lower position and outlet at top. Two vertically spaced layers of inclined channels are positioned in container so that liquid must flow upwardly through channels of each layer. Separation of layers prevents disturbance from eddy currents or other turbulence in liquid and enhances separation of solids.

3,615,026
APPARATUS FOR SHIFTING FLOWER POTS AND FOR LIFTING AND LOWERING SUCH POTS IN GARDENING NURSERIES

Ulrich Englert, Horrheim, Wurttemberg, Germany, and Konrad Dabritz, Konigsbergerstr. 31, Muhlacker, Wurttemberg, Germany

Filed June 20, 1968, Ser. No. 738,493
Claims priority, appplication Germany, June 24, 1967, P 15 82 719.7; Dec. 18, 1967, P 15 82 722.2
Int. Cl. A47g *29/00*
U.S. Cl. 211—80 **4 Claims**



Extension arms are connected to a plurality of flower pot holders, each of which is adapted to receive a flower pot. The extension arms are relatively movably connected to each other so that said holders and arms form a grid structure in which the spacing of said holders is variable. A series of forks, each of which is adapted to embrace and support a pot, are connected by a linkage, which is provided with handles operable to vary the spacing of said forks.

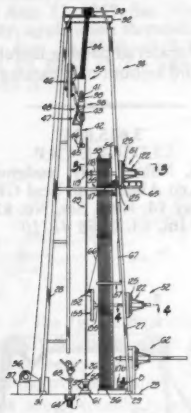
3,615,027
PIPE RACKING CONTROL SYSTEM

John E. Ham, Los Angeles, Calif., assignor to Byron Jackson Inc., Long Beach, Calif.

Filed Nov. 26, 1968, Ser. No. 779,171
Int. Cl. E21b *19/14*
U.S. Cl. 214—2.5 **21 Claims**

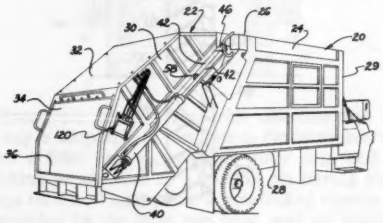
Control and operating systems for well pipe racking apparatus in which a number of vertically spaced racker arms are moved longitudinally to extend and retract the

racker arms as well as laterally relative to the pipe racking finger board, the racker arms having pipe supporting means for moving a length of pipe between the racking finger board and a position disposed over the rotary table of a drilling rig, and in which the control and operating systems include a hydraulic operating system comprising a reversible variable displacement pump for supplying fluid at a selected rate to either of a pair of motors, one of which effects longitudinal movement of one of the racker arms and the other of which effects lateral movement of said one of the racker arms. Such control and operating systems in which a second reversible variable displacement pump is employed to selectively supply fluid



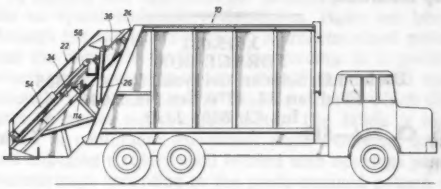
to either of a pair of motors for effecting longitudinal movement and lateral movement of the rest of the racker arms. Such control and operating systems in which the control system includes selectively operable control circuits for enabling actuation of an upper and a lower racker arm from the same location or, alternatively, to enable operation of the lower racker arm from said location and operation of the upper arm from another location. Such a control system in which a variable displacement pump is adjusted and caused to operate in reversed directions to displace fluid to the racker arm operating motors at a rate proportional to the extent of movement of a control member.

3,615,028
REFUSE HANDLING APPARATUS
William S. Appleman and Donal W. Chaney, Galion, Ohio, assignors to Harsco Corporation, Harrisburg, Pa.
Filed Feb. 19, 1969, Ser. No. 800,619
Int. Cl. B65f *3/00*
U.S. Cl. 214—83.3 **5 Claims**



A refuse truck of the rear loading type provided with a novel packer blade and associated control apparatus. More specifically, the packer blade is mounted on a carriage that is arranged to reciprocate on an inclined track means so as to load and pack the truck body and the blade and carriage are respectively actuated by separate hydraulic cylinders which are in turn controlled in a novel manner so as to operate the carriage and the blade through successive cycles each of which is controlled by a respective pressure responsive controller. As a result, each of said cycles is automatically terminated by the occurrence of a predetermined pressure value and the mechanism will automatically proceed to the next succeeding cycle.

3,615,029
REAR LOADING REFUSE VEHICLE
Orin M. Anderson, P.O. Box 14147, San Antonio, Tex. 78214
Filed Mar. 21, 1969, Ser. No. 809,104
Int. Cl. B65f *3/00*
U.S. Cl. 214—83.3 **1 Claim**



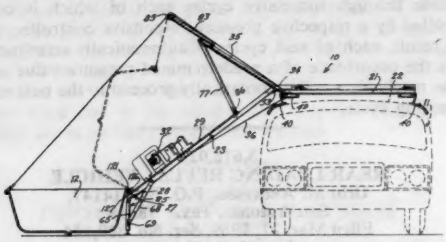
A rear loading refuse vehicle having a rear end opening, a hollow door hingedly connected to the body for swinging movement into and out of closing relation to the opening and having spaced apart, upright, planar side walls each provided with an upwardly and forwardly inclined slot extending therethrough. Each slot has a slide assembly movably extended therethrough for sliding movement longitudinally in the slot and having means engageable with surface portions of the wall to hold the assembly in the slot. A sweep panel extends between the assemblies in the slots and is movably mounted thereon for movement with the assemblies and for rotation about its upper end to allow the panel to sweep through the hopper to sweep refuse from the hopper and to move upwardly to move the refuse into the body through the opening.

Power means is provided for moving the slide assemblies in the slots and for rotating the sweep panel and means is provided for actuating the power means to move the panel to a lower position and rotate the panel to sweep the refuse from the hopper and move the panel upwardly to move the refuse into the body through the opening.

3,615,030
SELF-LOADING BOAT CARRIER
Emory Wuest, 4135 N. Monitor Ave., Chicago, Ill. 60634, and Adolph G. Klemm, 10956 Wellington, Melrose Park, Ill. 60164
Filed Sept. 18, 1969, Ser. No. 859,124
Int. Cl. B60n *9/00*
U.S. Cl. 214—450 **6 Claims**

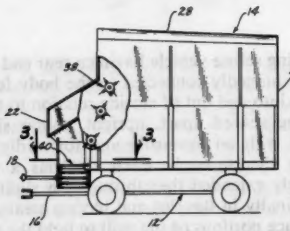
A device mountable atop an automobile which includes a frame attachable to the roof of the automobile, the frame carries a bed, atop of which a boat may be mounted. The bed has roller wheels associated therewith and the frame has foldable leg means attached thereto which are adapted to extend from the portion of the frame atop the automobile outwardly and downwardly to a position adjacent the side of the automobile. The bed is adapted to roll off the frame onto the legs. The bed carries a winch and the frame has a jim boom associated therewith cooperating with the winch cable to lift a boat from alongside of the ends of the legs to a position atop

the bed, the winch cable thereafter being capable of attachment to a portion of the frame to lift the bed with



the boat mounted thereatop along the legs to a position atop the frame.

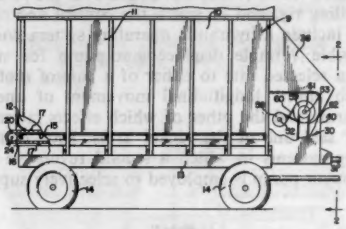
3,615,031
FORAGE BOX
Dorland H. Schuler, Griswold, Iowa 51535
Filed Jan. 12, 1970, Ser. No. 2,046
Int. Cl. B60p *1/38*
U.S. Cl. 214—519 **7 Claims**



A forage box including a floor conveyor means adapted to convey forage material or the like forwardly to a discharge conveyor means at the forward end of the box. The discharge conveyor means has a discharge end spaced outwardly of one side of the box to facilitate the discharge of material into an elevator or the like. The discharge conveyor means is of the slat and chain type and has a plate means removably mounted thereon which prevents material from passing downwardly therethrough when in position. The plate means is removable so that the material on the discharge conveyor will pass downwardly therethrough into a silo pit or the like when the plate has been removed. The plate means includes means for inserting the plate in the discharge conveyor and also includes means for detachably maintaining the same thereon.

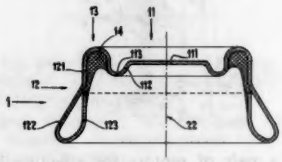
3,615,032
FORAGE METERING MECHANISM
Arnold Zimmerman, Downers Grove, and Peter Sammarco, Bellwood, Ill., assignors to International Harvester Company, Chicago, Ill.
Filed Sept. 24, 1969, Ser. No. 860,561
Int. Cl. B60p *1/36*
U.S. Cl. 214—519 **9 Claims**

A mechanism to meter the unloading of material onto a conveyor from a self-unloading wagon, the mechanism comprising a pair of parallel rotors superposed with respect to the conveyor and being rotatable in opposite directions and at substantially different speeds, wherein the slower rotor acts to block material from falling upon the conveyor and serves to deliver material deposited thereupon to the faster rotor which coacts with the slower rotor



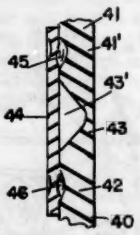
to shred and meter material passing therebetween to thereby meter the size and amount of it passing to the conveyor.

3,615,033
CLOSURE CAP
Armando Podesta, Milan, Italy, assignor to Societe de Conditionnement en Aluminium Scal GP, Paris, France
Filed May 14, 1969, Ser. No. 824,472
Int. Cl. B65d *41/10*
U.S. Cl. 215—39 **2 Claims**



A thin metal cap for closing containers with necks having an upper collar in which the cap is formed with a base portion having an elevated central disc, a truncated cone joining the outer edge of the central disc with a vertically disposed skirt portion having an upper cylindrical portion and a lower frustoconical portion with the lower edge rolled inwardly through an angle of 200° to 250°

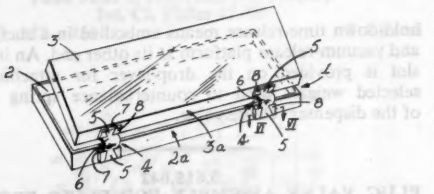
3,615,034
FRANGIBLE CONTAINER
Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840
Continuation-in-part of application Ser. No. 609,397, Jan. 16, 1967. This application Dec. 12, 1968, Ser. No. 783,320
Int. Cl. B65d *17/00*
U.S. Cl. 220—27 **3 Claims**



An apparatus for molding hollow containers which may be easily opened and the article itself are provided. The apparatus produces a thin-walled hollow container having a narrow strip-like portion of its wall reduced in

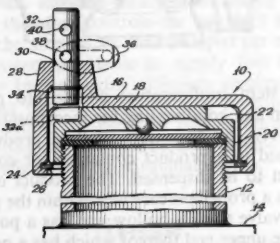
thickness to such a degree that the container may be easily opened. In one form, the container is severed by twisting. In another form, the wall is shaped with a strip-like portion which is severable by pulling on same. A cutting means may also be applied to effect opening. Auxiliary supporting means may also be provided to normally prevent severance of the weakened portion of the container.

3,615,035
UNITARY HINGES OF SYNTHETIC RESINOUS OR LIKE MATERIAL
John William Brian Newton, Johannesburg, Transvaal, Republic of South Africa, assignor to Newton and Taylor (Proprietary) Limited
Filed Aug. 12, 1969, Ser. No. 856,247
Claims priority, application Republic of South Africa, Aug. 20, 1968, 68/5,394
Int. Cl. B65d *51/04*; E05d *9/00*
U.S. Cl. 220—31 S **8 Claims**



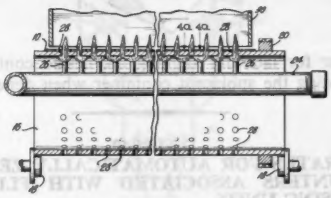
A hinge unit of the type comprising a pair of leaves; and a web integrally connecting the leaves together, the leaves and the web being made of synthetic resinous or like material and the web presenting a bending zone about which the leaves are pivotable relative to one another, which is characterized in that at least one of the leaves presents a mounting formation, such as a dove-tailed tongue, which is interengageable with a complementary hinge mounting formation, such as a dove-tailed groove, on a member, such as a container part, which is to be hingedly mounted.

3,615,036
LOCKING FILLER CAP
John J. Mross, Chicago, Ill., assignor to International Harvester Company, Chicago, Ill.
Original application Oct. 17, 1968, Ser. No. 768,262, now Patent No. 3,537,283, dated Nov. 3, 1970. Divided and this application Mar. 16, 1970, Ser. No. 19,583
Int. Cl. B65d *41/04*
U.S. Cl. 220—39 **3 Claims**



A three-piece locking cap with disconnecting drive, which cap is adaptable to two uses or functions and which includes a filler cap, a separable outer cap, and drive establishing means such as a locking pin having padlock openings therein. The cap has a non-locked closure function provided by the filler cap only, and an interrupter type locking function when the outer cap and locking pin are applied to the filler cap. The pin is selectively moved into drive establishing position of interengagement between the caps, or padlocked to the outer cap in a drive interrupter or disconnecting position.

3,615,037
APPARATUS FOR PROVIDING FABRIC WITH EMBROIDERY SIMULATION
John Viscardi, Lodi, N.J., assignor to Velourit Company, Inc.
Filed Sept. 22, 1969, Ser. No. 859,769
Int. Cl. B32b *31/26*
U.S. Cl. 156—497 **9 Claims**



A method and apparatus for achieving a fabric which has an eyelet embroidery simulation. Holes are burned through the fabric according to a predetermined pattern, and the fabric is flocked also according to a predetermined pattern in the region of the holes burned therethrough, so as to achieve in this way a fabric which simulates an eyelet embroidered fabric. The fabric is maintained in continuous movement while extending around and engaging a rotary shell formed with openings passing therethrough according to the predetermined pattern and receiving in its interior a pipe and nozzles which supply a combustion-supporting fluid to achieve flames passing through the openings as the fabric moves with the rotary shell so that in this way the openings are burned through the fabric. As the fabric continues to be fed beyond the shell it is flocked.

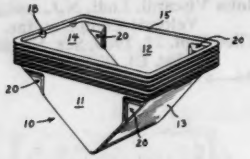
3,615,038
LAMINATED CONTAINER BODY
Charles Robert Brownold, Aurora, Richard Joseph Karas, Addison, and Henry Germanus Maeder, Jr., St. Charles, Ill., assignors to American Can Company, New York, N.Y.
Filed Apr. 21, 1970, Ser. No. 30,519
Int. Cl. B65d *25/14*
U.S. Cl. 220—63 R **9 Claims**

A container for packaging a food product such as ham or the like is made from a plastic laminate comprising two outer layers of high density polyethylene, two adjacent layers of low density polyethylene, and a central layer of saran.

3,615,039
NESTABLE CONTAINER
Frank A. Ward, Rockford, Ill., assignor to Anderson Bros. Mfg. Co., Rockford, Ill.
Filed July 28, 1969, Ser. No. 845,466
Int. Cl. B65d *21/02*
U.S. Cl. 220—97 C **6 Claims**

The container has triangular side panels and generally rectangular end panels joined to a peripheral flange at the open end. Each triangular side panel has a triangular recess at each corner adjacent the peripheral flange. The container is arranged for nesting inside an identical con-

tainer and the recess relieves the drag at the corners to facilitate denesting. Each recess also provides an upright



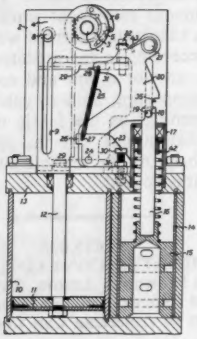
shoulder for laterally aligning the nested containers and for guiding the subjacent container when denested.

3,615,040

APPARATUS FOR AUTOMATICALLY ZEROIZING COUNTERS ASSOCIATED WITH FLUID DISPENSING UNITS

Hans Erik Eklund and Leif Gunnar Persson, Malmo, Sweden, assignors to Aktiebolaget Ljungmans Verkstader, Malmo, Sweden

Filed June 4, 1969, Ser. No. 830,377
Claims priority, application Sweden, June 10, 1968, 7,759/68
Int. Cl. B67d *5/26*
U.S. Cl. 222—33 **7 Claims**



An apparatus for zeroizing counters in fluid dispensing units, in which a slide valve is connected directly in the main fluid flow conduit and is actuable by the fluid pressure in said conduit for operating a zeroizing mechanism in such a way that said conduit is kept closed until the counters are zeroized, whereby all manual adjustments hitherto necessary are eliminated.

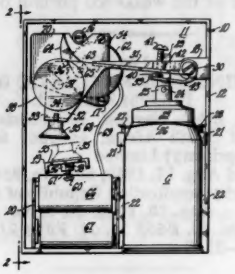
3,615,041

PERIODICALLY ACTUATED AEROSOL DISPENSER

Garth Lamont Bischoff, 190 N. Cypress St., Orange, Calif. 92666

Continuation-in-part of application Ser. No. 301,049, Aug. 9, 1963, now Patent No. 3,182,857, dated May 11, 1965. This application Mar. 25, 1970, Ser. No. 22,595
Int. Cl. G04c *23/38*
U.S. Cl. 222—70 **4 Claims**

Apparatus is contained in a housing having an insertion socket for successive aerosol containers, such as dispense insecticides by release at timed intervals. The apparatus provides a battery-driven electric motor having a lifting cam; on each single rotation, the cam trips a transverse drop-lever which triggers the spring-loaded release valve of the dispenser. At end of each rotation, the motor is shut off by a magnet on the cam, which opens a magnetic reed valve to break the battery-to-motor circuit. During off period, a capacitor is charged through a secondary circuit, and then discharged to the motor to initiate another motor-and-cam rotation which removes the cam-magnet from the reed valve, allowing latter to close battery-to-motor circuit so as to power remainder of revolution. The period required for the capacitor to charge is set as the desired interval between successive discharges of the aerosol release valve. The actuating drop-lever also has adjustable tension means at its trigger end, plus



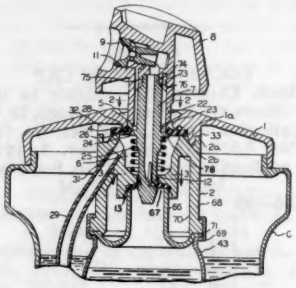
hold-down time-release means embodied in a suction cup and vacuum-release platform at its other end. An insertion slot is provided on the drop-lever for attachment of selected weights used to counterbalance spring tension of the dispenser release valve.

3,615,042

PLUG VALVE ASSEMBLY FOR FLUID PRODUCT DISPENSER HAVING A STEM CONFIGURATION FOR EASY MANIPULATION AND GOOD SEALING

Jean Marand, St. Benoit, France, assignor to Geigy Chemical Corporation, Ardsley, N.Y.

Continuation-in-part of application Ser. No. 718,165, Apr. 2, 1968. This application Oct. 15, 1968, Ser. No. 778,905
Int. Cl. D65d *6/14*
U.S. Cl. 222—193 **28 Claims**



A valve stem configuration adapted to provide easy manipulation and good sealing for incorporation in a plug valve assembly for dispensers of fluid products adapted to be attached to a product container for containing the fluid product to be dispensed. The product container accommodates a propellant cartridge within the product container. The valve stem is hollow and has a pushbutton actuator on the upper end thereof which has a nozzle therein communicating with said hollow stem. A cap member fits over a product container and has an aperture therein through which the hollow stem is movable, and a support is secured to the under side of said cap and has a hollow central portion through which said hollow stem is movable. A dip tube is secured in said support and opens into said hollow interior, and a fluid product flow path extends along said hollow stem exteriorly of the hollow thereof from a point adjacent said hollow interior. A first flexible gasket means is positioned in said plug valve assembly through which said hollow stem passes

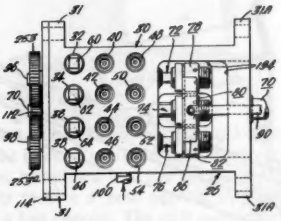
for obturating said fluid product flow path between said fluid product flow path and said hollow interior. The support has a downwardly open recess therein, and a second flexible gasket means is positioned in the bottom of said recess through which said hollow stem passes. The lower end of the hollow stem has a reduced diameter neck and at least one aperture therein opening into the space around the neck, said aperture being obturated by said second flexible gasket means. A retaining ring holds said second gasket means in said recess and secured to said support and has the outer lower edge secured in gas tight relationship to a propellant cartridge.

3,615,043

FLUID METERING AND DISTRIBUTING SYSTEM

Russell B. Hussey, East Longmeadow, Mass., and John A. Kimberley, Granby, Conn., assignors to AMBAC Industries, Incorporated, Garden City, N.Y.

Filed Mar. 7, 1969, Ser. No. 805,251
Int. Cl. F02m *41/08*
U.S. Cl. 222—250 **8 Claims**



A shuttle-piston type of fluid metering device in which the length of stroke of the shuttle piston is adjustable by control of the position of the piston for which one end-chamber of the cylinder becomes closed to arrest the piston stroke. Preferably the discharge path for said chamber extends through a pair of adjacent axially disposed and displaced bores in the piston, these two bores being bridged during travel of the piston by an annular passageway in an external axially-positionable control member. When the piston reaches a predetermined position in the cylinder, the external interconnecting passageway is thereby blocked and the corresponding end-chamber thereby sealed off to provide arrest of the piston travel. The axial position of the external member containing the annular passageway therefore controls the length of stroke of the piston and the amount of fluid pumped per stroke of the piston. A system adaptable to supply fuel to anywhere from one to twelve engine cylinders employs three such fluid-metering devices supplying two synchronized fluid-distributing shafts to produce twelve outputs, various groups of which outputs can be used depending upon the number of cylinders in the particular engine.

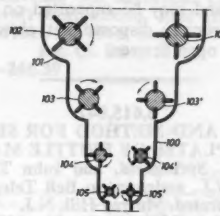
3,615,044

DEVICE FOR REDUCING THE CROSS-SECTIONAL AREA OF A STREAM OF MATERIAL

Francis Bonneric, Fleury-les-Aubrais, France, assignor to Service d'Exploitation Industrielle des Tabacs et des Allumettes, Paris, France

Filed Feb. 12, 1969, Ser. No. 798,632
Claims priority, application France, Feb. 15, 1968, 139,917
Int. Cl. G01f *13/00*; B65g *65/46*
U.S. Cl. 222—280 **8 Claims**

Distributor for processing a solid material in the divided state such as tobacco in the form of flakes or shreds and adapted to deliver continuously a uniform outflow of predetermined cross-sectional area starting from a nonhomogeneous input stream, said distributor being of the type comprising a passageway in which pairs of rotary units increase the velocity of the stream of material in proportion to the reduction in cross-sectional area of the passageway between the upstream and down-



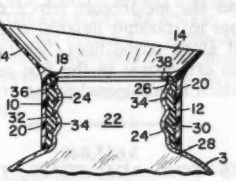
stream side of the pair considered, wherein the rotary units of at least one pair are so designed as to provide therebetween a free cross-sectional area of flow which is not reached by the rotating components and which decreases in the downstream direction as a direct function of the reduction in overall diameter of the rotary units.

3,615,045

ADAPTER TOP FOR GLASS DECANTERS

Albert P. Fiorini, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 1, 1969, Ser. No. 811,767
Int. Cl. B65d *25/40*; B67c *9/00*
U.S. Cl. 222—542 **1 Claim**



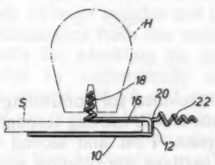
A one-piece adapter top for facilitating the pouring and holding of a glass decanter is permanently secured to an undulated neck portion of the decanter by means of a press-on compression fit provided by a deformable elastic gasket positioned between a portion of the adapter and said neck portion.

3,615,046

WIG STAND

Christine J. Bashara, 2710 Steel, Houston, Tex. 77006

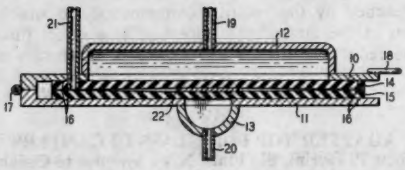
Filed June 3, 1970, Ser. No. 42,994
Int. Cl. D06c *15/00*; A41h *5/00*
U.S. Cl. 223—66 **7 Claims**



A wig stand in the form of a support for a head form for a wig which stand is formed with a base having a planar portion to rest upon a flat supporting surface and

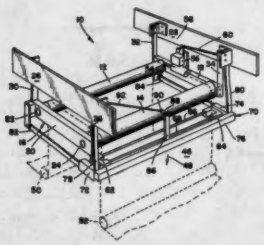
arm portions parallel to and spaced from said planar portion and having end portions positioned to serve as handles for holding the stand or which may be inserted into an opening in a head form to support the head form on the stand. Either of said end portions may be used to support a head form while the other is used as a handle. One of the arm portions is positioned over the base in spaced relation thereto to form with the base a clamp by which the stand may be supported on a shelf or the like or on a vertically disposed flat object such as the front wall of an open drawer.

3,615,047
APPARATUS AND METHOD FOR SEPARATING SCRIBED PLATES OF BRITTLE MATERIAL
David Feldman, Springfield, and John T. Sibilia, New Providence, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed June 30, 1969, Ser. No. 837,845
Int. Cl. B26f *3/00*
U.S. Cl. 225—1 **2 Claims**



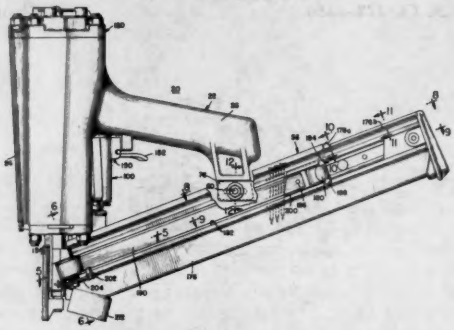
Apparatus for separating a scribed plate of brittle material utilizes two flexible membranes between which the plate is vacuum clamped. A uniform force such as fluid pressure forces the membranes into a die which causes the membranes to transmit uniaxial stresses to the plate to separate it along scribe lines. Separation along a set of scribe lines orthogonal to the first set is achieved by using a die which is orthogonal to the first die.

3,615,048
APPARATUS FOR ADJUSTING THE LATERAL POSITION OF A CONTINUOUS MOVING WEB
John R. Martin, Rockford, Ill., assignor to Martin Automatic Incorporated, Rockford, Ill.
Filed Apr. 3, 1969, Ser. No. 813,110
Int. Cl. B65h *25/26*
U.S. Cl. 226—20 **10 Claims**



Apparatus is provided for controlling the lateral position of a continuous web moving through a machine such as a printing press. First and second spaced rolls are mounted on a carriage for rotation about parallel axes, with the web leaving the second roll parallel to the web arriving at the first roll. Flexible straps support the carriage, each strap being flexible substantially only normally of the plane including the respective strap and the line in the plane of the approaching web tangent to the mid-point of the first roll, thereby constraining the carriage to rotation about that line as a fixed axis. Edge detectors sense the lateral position of the web and produce a control signal used to drive the carriage about its axis to control the lateral position of the web. The edge detectors may be mounted adjacent the second roll for rotation with the carriage about a fixed axis substantially coincident with the mid-line of the leaving web tangent to the second roll.

3,615,049
FASTENER DRIVING TOOL
Allen R. Obergfell, Park Ridge, Edward J. Novak, Franklin Park, and Richard H. Doyle, Mount Prospect, Ill., assignors to Fastener Corporation, Franklin Park, Ill.
Filed Sept. 15, 1969, Ser. No. 857,930
Int. Cl. B27f *7/06*
U.S. Cl. 227—8 **5 Claims**

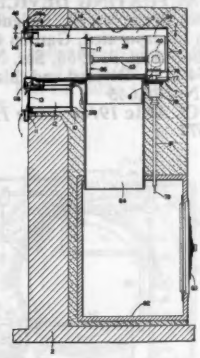


There is provided a fastener driving tool of the type including a drive piston slidably mounted with a main cylinder and movable through a drive stroke by the supply of pressurized fluid above the piston and movable through a return stroke by the exhaust of the cylinder above the drive piston. Metered passage means are provided through the piston to provide a positive head of pressure below the piston during the return stroke of the piston, thereby preventing ingestion of dust-laden contaminated outside air. In addition, the fastener driving tool is provided with an improved magazine construction formed of sheet metal having a track for supporting the heads of nail type fasteners. The strips of fasteners are loaded through an opening in the rear of the magazine assembly and are advanced toward the drive track of the device by a pusher which may be pulled back and cammed over a strip of fasteners inserted into the magazine until it picks up the last fastener of the strip. In addition, the fastener driving tool is provided with a projection which locks a safety member upon depletion of the fasteners within the magazine assembly to a predetermined point.

3,615,050
AFTER-HOUR BANK DEPOSITORY
Charles U. Deaton, Denver, Colo., and Paul A. Leipelt, Canton, and Leo J. Grosswiller, Jr., East Canton, Ohio, assignors to Diebold, Incorporated, Canton, Ohio
Filed Apr. 20, 1970, Ser. No. 29,824
Int. Cl. E05g *1/00*
U.S. Cl. 232—43.3 **32 Claims**

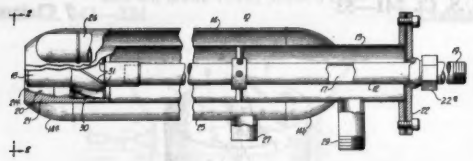
An electrically operated automatic after-hour bank depository which has a movable security chamber for handling bags or receiving envelopes. The security chamber is closed by a key locked main door having an envelope slot therethrough. A secondary door closes the main door and envelope slot. A bag or an envelope deposited in the

security chamber, either by opening the main and secondary doors, or by envelope insertion through the slot upon opening the secondary door, after closure of the doors is automatically conveyed in the security chamber by a power operated truck mechanism to a horizontally located opening at the rear of the unit through which the bag or envelope drops vertically downward through a chute into a receiving chest or safe. Closing of the doors initiates automatically the movement of the deposit to the



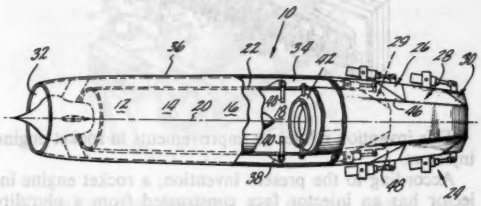
receiving chest. The doors are deadlocked upon closing and cannot be opened until the depositing cycle of operation has been completed and the parts restored to a position ready to receive a new deposit. A customer key is required for a bag deposit. The unit is deadlocked in event of power failure, or malfunction in the system, or tampering with the circuitry or mechanism. The unit structure is physically locked to the receiving chest and can be released only by access from within the chest. The entire unit is trim and compact and occupies a minimum of space when installed.

3,615,051
METHOD AND APPARATUS FOR THE COMBUSTION OF FUELS
Donald M. Gettig, Elk Grove Village, and Edward A. Grobel, Mundelein, Ill., assignors to Chemetron Corporation, Chicago, Ill.
Filed May 29, 1968, Ser. No. 733,018
Int. Cl. A01n 17/02
U.S. Cl. 239—8 **3 Claims**



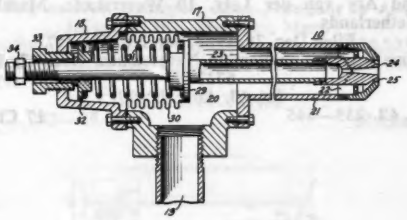
A fuel burner for burning large volumes of combustible fluid fuels is formed of three concentric tubes forming an inner chamber for the conveyance of the fuel, an intermediate annular chamber for conveying both oxidizing and atomizing gas, and an outer annular chamber for coolant. The fuel is directed from the nozzle in streams generally outwardly, and the oxidizing and atomizing gas is given a violent whirling motion which intersects the fuel streams at an angle so as to completely atomize the fuel and to supply stoichiometric volumes of oxygen. The method includes the steps of spraying fuel in streams from the end of a nozzle and of intersecting the streams with a swirling flow of oxidizing and atomizing gas in sufficient volume to provide a stoichiometric volume of oxygen and at the same time to atomize the fuel.

3,615,052
VARIABLE AREA EXHAUST NOZZLE
Julius W. Tumavicus, Old Saybrook, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.
Filed Oct. 17, 1968, Ser. No. 768,476
Int. Cl. B64c 15/06
U.S. Cl. 239—265.39 **18 Claims**



A variable area exhaust nozzle for a thrust generating engine which includes an exhaust duct member with fixed side walls and with a plurality of pivotable flaps attached thereto and cooperating therewith to define a high aspect ratio exhaust nozzle when the flaps are pivoted inwardly to their minimum area position and a low aspect ratio exhaust nozzle when the flaps are pivoted outwardly to their maximum area position.

3,615,053
GAS PRESSURE REGULATED ATOMIZER TIP FOR GAS/OIL BURNER
Bradford K. Pease and Richard J. Reinbold, Allentown, Pa., assignors to Bethlehem Steel Corporation
Filed June 16, 1970, Ser. No. 46,709
Int. Cl. B05b 7/12
U.S. Cl. 239—407 **3 Claims**

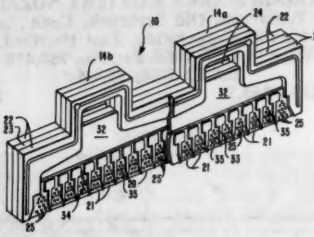


A burner suitable for firing a gaseous fuel or a combination of a gaseous and a liquid fuel with the gas being used to atomize the liquid fuel. Primary gas is introduced tangentially into the oil stream in the throat of a venturi nozzle designed to expand the mixture. Secondary gas discharges through an outer annulus and impinges on the gas-oil mixture discharging from the venturi nozzle. The size of the annulus for admitting the secondary gas is rendered adjustable by automatically moving the oil atomizing nozzle in and out of said annulus, so as to maintain constant gas pressure in the primary gas tube at all gas inlet rates. The velocity of the mixture discharging from the nozzle will then be constant at all gas flow rates. The burner has given excellent results in atomizing fuel oil with gas flows as low as 17% of the total B.t.u. fired at a high firing rate (30 g.p.h. oil equivalent total fuel in the case of the burner tested), and also with 50% gas at a low firing rate (10 g.p.h. equivalent total fuel).

3,615,054
INJECTORS

Richard J. La Botz, Fair Oaks, Calif., assignor to Aerojet-General Corporation, Azusa, Calif.

Filed Sept. 24, 1965, Ser. No. 489,970
Int. Cl. B05b 1/14; F23d 13/44
U.S. Cl. 239—553.3 13 Claims



This invention relates to improvements in rocket engine injectors.

According to the present invention, a rocket engine injector has an injector face constructed from a plurality of discrete thin wafers, each having planar surfaces and edge surfaces. A controlled pattern of flow passages is formed in one planar surface of each wafer, each flow passage terminating at an edge surface of the wafer. The wafers are joined together in a stack and the passage terminating edge surfaces from the injector face of the injector. The flow passages are adapted to pass liquid propellant therethrough.

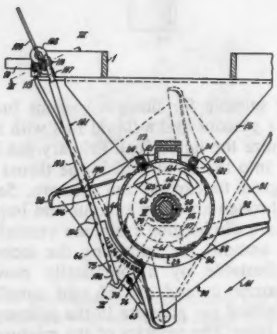
According to one form of the invention, the liquid propellant is delivered to the injector face in such a manner that the fuel flows through passages on certain wafers and the oxidizer flows through passages on other wafers.

According to another form of this invention, fuel and oxidizer vents are provided whereby propellant leaks on the planar surfaces of the wafers will be driven from the planar surfaces.

3,615,055
SPREADING IMPLEMENTS

Cornelis van der Lely, 7 Bruschenrain, Zug, Switzerland, and Ary van der Lely, 10 Weverskade, Maasland, Netherlands

Filed Dec. 20, 1968, Ser. No. 785,497
Claims priority, application Netherlands, Dec. 27, 1967, 6717659
Int. Cl. A01c 17/00
U.S. Cl. 239—665 17 Claims

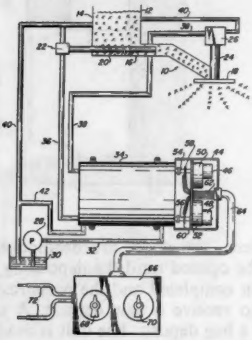


This invention relates to spreading implements comprising a frame movable over the ground, a container for material to be spread, a spreading member, at least one outlet port through which material from the container can reach the spreading member and a flow control member movable relative to one or more outlet ports to govern the open area of the latter and adjusting or setting mechanism for said flow control member. The flow control includes an adjusting mechanism which can be manually moved simply and quickly to shut off flow or to set the flow of material to a pre-selected amount.

3,615,056
REMOTE CONTROL ELECTRIC ACTUATING DEVICE

Paul C. Weiss, Evanston, Ill., assignor to AMBA Industries Incorporated, Garden City, N.Y.

Original application Aug. 9, 1968, Ser. No. 751,446, now Patent No. 3,549,120. Divided and this application May 12, 1970, Ser. No. 36,645
Int. Cl. A01c 19/00; E01c 19/20
U.S. Cl. 239—677 4 Claims

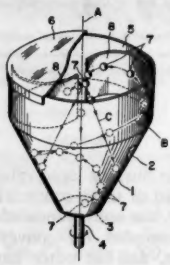


Electrically controlled hydraulic valve arrangements with integral hydraulic override whereby the flow of fluid through one valve controls in part the operation of the other valve; the two valves being connected to operate different hydraulically driven motors connected respectively to a conveyor mechanism and a spreader mechanism for distribution of sand or aggregate.

3,615,057
ROTARY MILL

Tatsuo Hagiwara, Tokyo, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe-shi, Japan

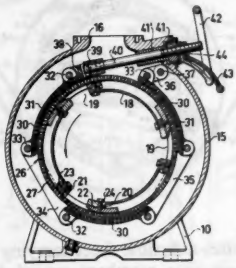
Filed Mar. 6, 1969, Ser. No. 804,854
Claims priority, application Japan, Mar. 12, 1968, 43/15,566
Int. Cl. B02c 17/04, 17/10
U.S. Cl. 241—53 7 Claims



A rotary mill for fine comminution with the aid of grinding bodies comprises a rotary shell having a substantially conical inner surface increasing in diameter in going from bottom to top and which is adapted to rotate about a central vertical axis of the rotary shell, and at

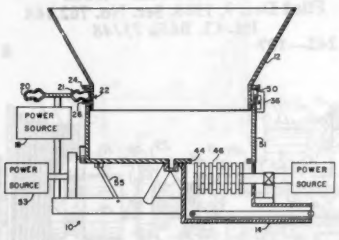
least one guide plate is arranged in the upper portion of the interior of the rotary shell for directing grinding bodies downwardly after they are moved upwardly along the substantially conical inner surface in sprial paths by centrifugal forces.

3,615,058
REFINER FOR FIBRE SUSPENSIONS
Harry Vilhelm Nilsson, Vanersborg, Sweden, assignor to Aktiebolaget Vargons Mek. Verkstad, Vargon, Sweden
Continuation-in-part of application Ser. No. 662,653, Aug. 23, 1967, This application July 3, 1969, Ser. No. 838,893
Claims priority, application Sweden, Sept. 30, 1966, 13,228/66
Int. Cl. B02c *17/02*
U.S. Cl. 241—85 **6 Claims**



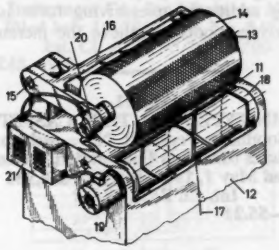
A refiner for fibre suspensions comprises a stationary distributor drum with an inlet for fibre suspensions and a grinding apparatus surrounding outlets in the distributor drum. The grinding apparatus includes a perforated, rotatable, cylindrical wall surrounded by a plurality of perforated, arcuate grinding plates spaced and secured around the periphery of the cylindrical wall and connected together by a linkage coupled to an adjustment device which can control the clearance between the grinding plates and the cylindrical wall. Each grinding plate extends opposite an outlet of the distributor drum and a portion of the drum ahead of the outlet as viewed in the direction of rotation of the cylindrical wall.

3,615,059
PNEUMATIC DRIVE MEANS FOR GRINDING APPARATUS
Eugene Charles Moeller, 2017 24th Street Road, Greeley, Colo. 80631
Filed Apr. 14, 1969, Ser. No. 815,694
Int. Cl. B02c *4/00, 4/06, 11/04*
U.S. Cl. 241—224 **6 Claims**



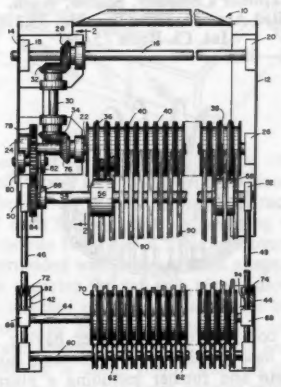
A grinding mechanism for grinding various materials and having a hopper divided into two portions. The hopper portions having separate mechanisms for advancing material wherein the upper portion is advanced by a pneumatic tire for reducing noise and increasing the reliability and life expectancy of the apparatus and the lower portion uses oscillatory motions.

3,615,060
APPARATUS FOR WINDING ENDLESS YARNS ON A SPOOL
Rudolf Jenny, Horgen, Switzerland, assignor to Maschinenfabrik Schweiter AG, Horgen, Switzerland
Filed Mar. 21, 1969, Ser. No. 809,334
Claims priority, application Switzerland, Apr. 25, 1968, 6,169/68
Int. Cl. B65h *54/42*
U.S. Cl. 242—18 DD **4 Claims**



A method and apparatus for winding endless yarns on a spool is disclosed, the method and apparatus providing a winding having a constant winding ratio, i.e., a so-called "precision winding," wherein the number of spool revolutions per thread-guide stroke in a cross winding arrangement remains constant. The inventive method and apparatus is applicable for winding an endless yarn fed at a constant speed onto a spool driven at its circumference by a drive cylinder. The thread is fed to the spool via a grooved drum or a thread-guide operated by a grooved drum. The drive cylinder is driven in known manner at a constant speed. Yet, the grooved drum itself is driven in dependence upon and as a function of the number of rotations of the yarn spool or the diameter of the yarn spool and thus a constant winding ratio is maintained.

3,615,061
INSTANTANEOUS CORRECTIVE RESPONSE DRIVE MECHANISM FOR CONTINUOUS FILM PROCESSORS
Alex Bagdasarian, Arlington, Mass., assignor to Artisan Industries Inc., Waltham, Mass.
Continuation-in-part of application Ser. No. 620,703, Mar. 6, 1967. This application June 24, 1969, Ser. No. 840,127
Int. Cl. B65h *17/42;* **G03d** *3/12*
U.S. Cl. 242—55.01 **32 Claims**



An improved film transport device for transporting film or other strip material, which device includes a rack having a top driven shaft and a plurality of primary overdriven spools thereon. Spaced apart from the shaft is a

fixed shaft having a plurality of idle spools thereon. The overdriven and idle spools define a plurality of loop-to-loop arrangements of film material. Spaced apart from the overdriven spools is a continuously driven friction drive roller. During normal operating conditions, the film is moved through the loop-to-loop arrangement by the overdriven spools, and the friction drive roller does not engage said spools. When an increase in film tension is felt within the loop-to-loop arrangement, there is engagement between the overdriven spools and the friction drive roller whereby additional overdriving force is imparted to said overdriven spools to relieve the increase in film tension.

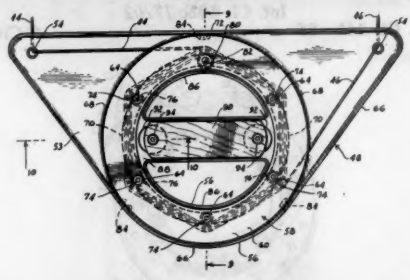
3,615,062
PUSH-IN TYPE FILM/TAPE CASSETTE
Howard A. Goodman, Peekskill, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed May 1, 1969, Ser. No. 820,981
Int. Cl. B65h *17/48*
U.S. Cl. 242—55.21 **8 Claims**

A film or tape cassette for receiving film or tape (film/tape) positively driven into said cassette, comprising a cover member, a take-up reel, and a spiral film guide, whereby film entering said cassette is guided by said spiral film guide about the the outer diameter of the take-up reel, which is frictionally driven by the entering film/tape about a center hub, to wind the film/tape from the outer diameter to the inner diameter of the take-up reel, as opposed to currently winding from the center hub outwardly, for ready replay without rewinding.

3,615,063
PLASTIC CORE FOR PAPER ROLLS
Dana B. Bates, Kirkland, Wash., assignor to Simpson Timber Company, Seattle, Wash.
Filed Apr. 30, 1970, Ser. No. 33,270
Int. Cl. B65h *75/18*
U.S. Cl. 242—68.6 **5 Claims**

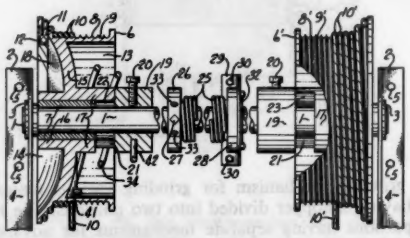
A plastic core for rolls of paper having a generally circular flat base portion with a circular hole centrally located therein and further including a plurality of upstanding walls on the same side of the base member, one wall immediately adjacent the centrally located hole and another of the walls being slightly spaced from the outer periphery of the base member. The core further includes a plurality of webs having a tapered configuration extending between the walls and protruding upwardly therefrom and a plurality of reinforcing members integrally molded with and extending from the outer sides of the outermost wall and the base member, extending only as far as the outer circumference of said base member.

3,615,064
TWO STRING KITE AND CONTROL THEREFOR
Donald P. Gellert, St. Thomas, Virgin Islands, assignor to U.S.M. Precision Products Inc.
Filed July 5, 1968, Ser. No. 742,687
Int. Cl. A63h *27/08*; B64c *31/06*; B65h *75/38*
U.S. Cl. 242—96 **11 Claims**



A kite comprises a flexible sheet carrying a central rigid member and two spar members spaced from the rigid member, a resilient wire extending between the two spar members to spread the spar members apart so as to maintain tautness of the sheet. A pair of kite strings is operatively connected to the kite, one of said strings being in operative connection with each one of said spar members, whereby controlled movement of the kite strings produces relative movement of one of the spar members with respect to the rigid member, thereby varying the effective area of one section of the sheet, thereby to cause controlled guidance of the kite. Also, disclosed is a remote, hand held control device from which the two kite strings are released from two spaced points thereon, a handle being provided to the rear of these spaced release points. A reel carried by the control device, upon which the two kite strings are wound, is of relatively large diameter and has a very narrow drum portion, whereby the two kite strings wound thereon lie uniformly about the drum portion.

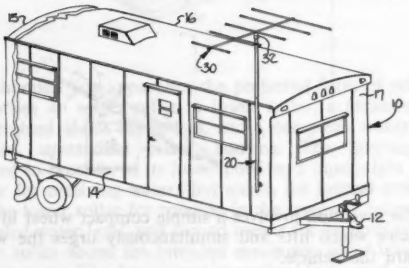
3,615,065
TORSION COUNTERBALANCE WITH CABLE PRETENSIONING DEVICE
Adelma O. Elliott, 1130 Osterhout Road, Kalamazoo, Mich. 49002
Filed Dec. 9, 1968, Ser. No. 782,168
Int. Cl. B65h *75/48*
U.S. Cl. 242—107 **8 Claims**



A counterbalance with a cable pretensioning device which is particularly adaptable to torsion spring

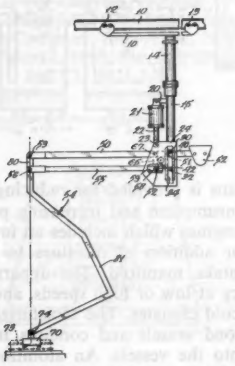
counterbalances or rotary shaft driven lift garage doors or the like to prevent undue slack in the winch lines or cables. The coupling between the cable drum and the means which drives the drum permits limited relative rotary movement. The coupling is preferably spring biased such that the winding drum is biased for rotation in its wind-up direction relative to the drive side of the coupling.

3,615,066
ANTENNA MOUNTING STRUCTURE
Adolph F. Warnecke, 4624 Bragg Blvd., Fayetteville, N.C. 28303
Filed Mar. 12, 1970, Ser. No. 19,048
Int. Cl. H01q 1/12
U.S. Cl. 248—206 R **1 Claim**



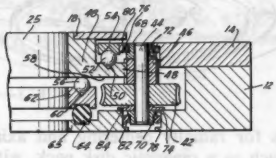
A mounting structure for securing an antenna to the exterior surface of a mobile home or the like. The structure includes an elongated tubular post having a plurality of laterally facing vacuum cups secured thereto for gripping the exterior surface of the mobile home. An adhesive is positioned between the cups and the exterior surface to increase the bond therebetween.

3,615,067
LOAD BALANCER
Noel G. Goudreau, Mendota, Ill., assignor to Conco, Inc.
Filed Mar. 19, 1969, Ser. No. 808,424
Int. Cl. A47f 5/00
U.S. Cl. 248—325 **8 Claims**



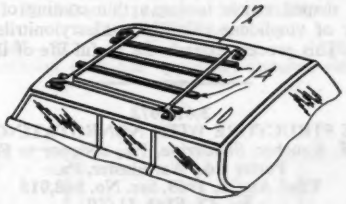
A loading balancer assembly of the type using a counterweighted parallelogram linkage wherein the load carrying arms include an offset portion together with means for applying a force to one of the arms that is sufficient to preclude creeping movement of the load carrying arm having the offset portion due to the presence of the offset portion therein.

3,615,068
PRECISION ROTARY TABLE
Arthur Edelstein, Jamaica, N.Y., assignor to Ardel Instrument Co., Inc., Jamaica, N.Y.
Filed July 14, 1969, Ser. No. 841,417
Int. Cl. A47b 95/00, 91/00
U.S. Cl. 248—349 **17 Claims**



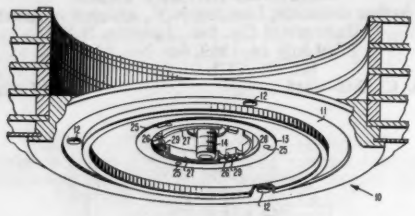
A precision rotary table for use in electro-optical research includes a stationary base member and a movable support part operatively connected to the base member and rotatable relative thereto. Precise positioning of the movable part in response to actuation of a manually operated means is effected by employing gearing mechanism in which the various rotating parts are continuously subjected to a constant force in a direction such that the meshing gears are placed in back-lash-free engagement with each other. An attachment device may be rotatably connected to the movable part, that device including mechanism which permits quick movement of the attachment device between two preselected positions.

3,615,069
LOAD SUPPORTING SLAT FOR LUGGAGE RACK OR THE LIKE
John A. Bott, 931 Lake Shore Drive, Grosse Pointe Shores, Mich. 48236
Filed May 8, 1969, Ser. No. 822,940
Int. Cl. F16m 11/00
U.S. Cl. 248—350 **1 Claim**



A two-piece slat for supporting luggage, or the like, on an automobile body. A plurality of such slats are used to define the bed of an automobile luggage rack. The construction of each slat includes a supporting rail fastened to the automobile body and a molding covering the rail. The rail is provided with various holes adapted to receive fasteners for securing the rail to a given automobile body with only a selected number of such holes being used at any one time. The molding is snap-fitted over the supporting rail and covers all the holes therein and the fasteners. The molding is made from relatively thin stainless steel while the rail is made from heavier galvanized steel. The molding possesses an attractive bright appearance and completely covers the rail and its fasteners while at the same time protecting the luggage from sharp corners, or the like, on the rail and the fasteners.

3,615,070
CENTERING AND HOLDING APPARATUS
Richard J. Charlton, Los Gatos, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 16, 1969, Ser. No. 816,746
Int. Cl. F16m *13/00*
U.S. Cl. 248—415 8 Claims

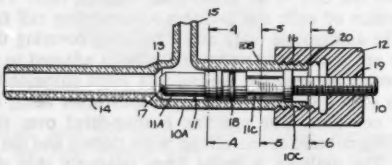


Apparatus for radially centering and axially aligning an object, such as a magnetic disk pack, with respect to a spindle of a disk file and holding the disk pack in place. The spindle is topped by a cylindrical surface beveled at the outer edge. The centering apparatus comprises a ring slotted to provide three spring-loaded tabs arranged to be of interference fit with the cylindrical surface. The beveled edge serves as a cam to spread the tabs of the ring radially and the tabs engage the cylindrical surface to hold and center the disk pack. A set of three buttons is provided with the centering apparatus to rest on a surface of the spindle to axially align the pack.

3,615,071
FLEXIBLE MOLD
Jack R. Harper, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.
Filed Apr. 16, 1969, Ser. No. 816,779
Int. Cl. B28b *7/06*
U.S. Cl. 249—112 3 Claims

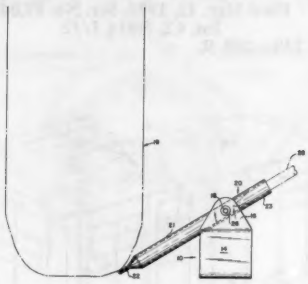
A method of forming shaped articles of polyester, polyurethane or epoxy resin by using a flexible mold wherein a thin continuous film of a methyl ethyl ketone soluble copolymer of vinylidene chloride and acrylonitrile is applied to the shape forming surface of the flexible mold prior to molding an article is disclosed. This process provides a shaped article having a thin coating of the copolymer of vinylidene chloride and acrylonitrile on the surface. This process extends the useful life of the mold.

3,615,072
VALVE STRUCTURE WITH NONROTATING STEM
Erwin K. Kaucher, Souderton, Pa., assignor to Fischer & Porter Co., Warminster, Pa.
Filed Aug. 6, 1969, Ser. No. 848,015
Int. Cl. F16k *31/50*
U.S. Cl. 251—265 2 Claims



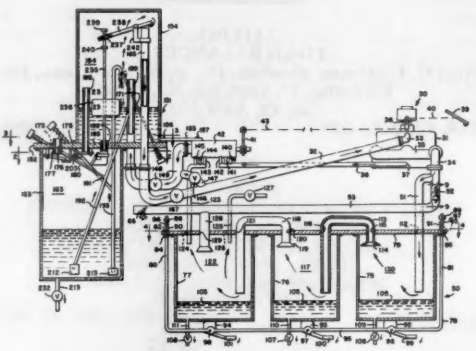
A valve structure for precisely controlling fluid flow, the valve including a differential thread arrangement adapted to axially shift a stem within a valve body to cause a head at the end of the stem to engage a valve seat without rotation of the stem, thereby minimizing scoring or distortion of the seat.

3,615,073
WHEEL LIFT ASSIST
Howard L. Lickey, 115 Bosworth St., Slidell, La. 70458
Filed Nov. 1, 1968, Ser. No. 772,513
Int. Cl. B66f *3/00*
U.S. Cl. 254—131 1 Claim



The invention involves a simple compact wheel lift for vehicles which lifts and simultaneously urges the wheel toward the vehicle.

3,615,074
APPARATUS FOR MOISTURIZING GASES
Daniel Cook, 2909 40th Ave., Gulfport, Miss. 39501
Filed June 6, 1968, Ser. No. 735,067
Int. Cl. F02d *9/04, 19/00;* F02m *17/34*
U.S. Cl. 261—18 8 Claims



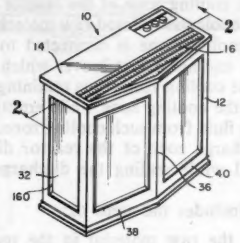
An apparatus is provided for reducing fuel and lubricating oil consumption and increasing power in internal combustion engines which includes an improved moisturizing unit for addition of moisture to gases being fed to the air intake manifold. The apparatus operates at peak efficiency at low or high speeds, and it may be used in warm or cold climates. The moisturizing unit includes first and second vessels and conduits introducing gases and water into the vessels. An atomizer is mounted in the first vessel. A conduit including an aspirator is connected to the second vessel for withdrawing water by aspiration and introducing the water into the first vessel. A conduit for equalizing pressures in the vessels is provided. An improved variable valve is also provided.

3,615,075

MOLDED PLASTIC HUMIDIFIER

Richard I. Heiman, Everett D. Wiseman, and Trueman P. Jordan, Columbus, Ind., assignors to Vernco Corporation, Columbus, Ind.

Filed Aug. 12, 1969, Ser. No. 849,341
Int. Cl. B01f *3/04*
U.S. Cl. 261—30 27 Claims



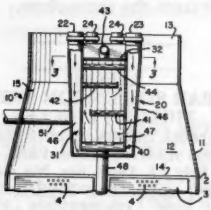
A humidifying apparatus, the preferred form of which comprises an upper roller, a lower roller, a foraminous belt trained about the rollers, and a one-piece, integrally molded, upstanding plastic housing. The housing is formed to provide, at its lower portion, a liquid-tight reservoir for receiving water, first means for journal mounting the lower roller for rotation in the reservoir below its intended water level, and second means for supporting the upper roller above the intended maximum water level of the reservoir. The first means is preferably formed to include, at each side of the reservoir, an upstanding flange having a generally V-shaped, upwardly opening notch formed therein for receiving the adjacent end of the lower roller, the lower roller being weighted so that it is gravity biased toward its seating in the notches. The second means is preferably formed to include, at each side of the housing, a pair of spaced-apart, inwardly extending flanges arranged to receive therebetween the adjacent end of the upper roller. A block for journal mounting each end of the upper roller is provided, each block extending between and being supported by one pair of flanges. The motor for driving the upper roller, the blocks for journalling the upper roller, and the gear box for drivingly connecting the motor to the upper roller are supported in slots formed in the flanges at the sides of the housing.

3,615,076

STEAM MANIFOLD AND FEED WATER HEATER FOR CONDENSERS

Robert J. Stoker, Phillipsburg, N.J., assignor to Ingersoll-Rand Company, New York, N.Y.

Filed Dec. 22, 1969, Ser. No. 886,865
Int. Cl. B01f *3/04*
U.S. Cl. 261—113 9 Claims



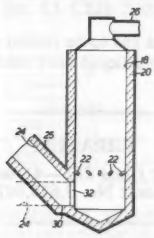
A combined steam manifold and feed water heater apparatus positioned in the steam dome of a condenser. The manifold arrangement is positioned to receive steam from the turbine and direct it to feed water heaters located outside the condenser. A direct contact feed water heater receives steam directly from the turbine and water to be heated from a source outside the condenser. The steam heats the water and the heated water is discharged through the steam dome to a consumer located outside the condenser. The apparatus is positioned to permit steam to be condensed to pass through the steam dome to the condenser.

3,615,077

GAS COOLING TOWERS

Kenneth Roy Parker, Sutton Coldfield, and Kenneth Darby and John Beardon, Harborne, Birmingham, England, assignors to Lodge-Cottrell Limited, Parade, Birmingham, England

Filed June 23, 1969, Ser. No. 835,652
Claims priority, application Great Britain, July 9, 1968, 32,724/68
Int. Cl. B01f *3/04*
U.S. Cl. 261—118 11 Claims



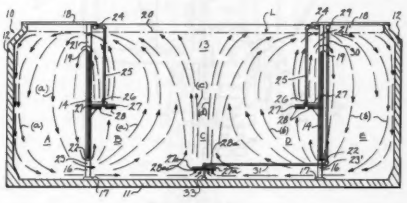
An evaporative gas cooling tower particularly for cooling waste gas of incineration prior to electro-precipitation comprises a divider member extending across its inlet duct to divide the gas entering the tower into two streams which meet and mix within the tower.

3,615,078

APPARATUS FOR AND METHOD OF AERATING LIQUOR IN LARGE SEWAGE TREATMENT TANKS

Paul M. Thayer, Milwaukee, Wis., assignor to Water Pollution Control Corp., Milwaukee, Wis.

Filed Dec. 3, 1969, Ser. No. 881,709
Int. Cl. B01f *3/04*
U.S. Cl. 261—123 10 Claims



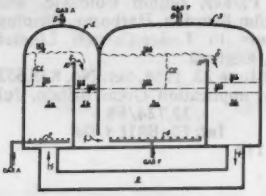
The aeration tank has oppositely-disposed side walls and has a series of baffles spaced inwardly from each side wall and extending parallel thereto, each baffle terminating a substantial distance short of the liquid level and short of the bottom of the tank. Extending along the inner side of each baffle about midway of the depth of the tank is a row of relatively low pressure air diffusers, and extending along the bottom of the tank midway between the two rows of low pressure diffusers is a row of relatively high pressure diffusers.

3,615,079

GAS HEAT EXCHANGER HAVING LIQUID HEAT CARRIER

Georges Cohen de Lara and Michel Delachanal, Grenoble, France, assignors to Societe Grenobloise d'Etudes et d'Applications Hydrauliques (Sogreah), Grenoble, France

Filed Mar. 22, 1968, Ser. No. 715,424
Claims priority, application France, Mar. 24, 1967, 5,086
Int. Cl. B01f *3/04*
U.S. Cl. 261—146 **8 Claims**



In this exchanger a gas to be cooled or heated is placed in direct contact with a liquid heat carrier by bubbling the gas therethrough.

ERRATUM

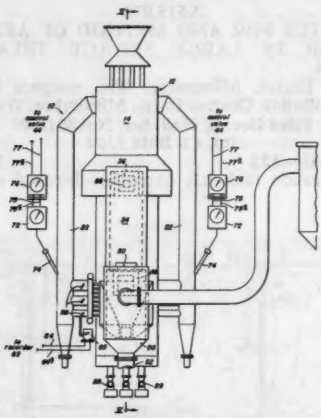
For Class 263—41 see:
Patent No. 3,615,082

3,615,080

APPARATUS FOR AND METHOD OF MANUFACTURING WHITE PORTLAND CEMENT CLINKER

Stewart W. Tresouthick, McCandless Township, Allegheny County, Pa., assignor to United States Steel Corporation

Filed Dec. 18, 1969, Ser. No. 886,232
Int. Cl. F27b *1/00*
U.S. Cl. 263—29 **38 Claims**



An apparatus for and method of manufacturing white portland cement clinker are disclosed. The apparatus has a reactor provided with a reactor bed adapted to receive and process white portland cement clinker raw material. The reactor has a heating and drying zone for removing the water from the raw material; a calcining adjacent the heating and drying zone for calcining the calcareous portion of raw material; a reaction zone adjacent the calcining zone for clinkering the raw material; a gas distribution zone adjacent the reaction zone for receiving a heating and reducing fluid having a pressure sufficient to traverse the reaction zone, the calcining zone and the heating and drying zone with a residual remaining pressure; and a gas seal zone adjacent the gas distribution zone. A divider in the gas seal zone split the flow of the sintered raw material into two channels. Each channel has a constricted passage in the direction of the flow of the sintered raw material to produce a pressure drop through the gas seal zone greater than the pressure in the heating and reducing fluid. A cooling zone of the reactor adjacent the gas sealing zone cools the sintered raw material. A cooling plenum in the cooling zone is connected to the heating and drying zone and has a first louver which defines with an exit louver the cooling zone, thus retaining the sintered raw material in the cooling zone while emitting the heating and reducing fluid from such cooling zone. A discharge means in a discharge zone of the reactor discharges the sintered material while sealing the discharge zone from the atmosphere.

The method includes the steps of:

(a) receiving the raw material in the reactor bed of the reactor;
(b) passing the raw material through a heating and drying zone to remove the water from the raw material;
(c) passing the dried raw material through a calcining zone adjacent the heating and drying zone to calcine the calcareous portion of the raw material;
(d) passing the reacted raw material through a gas distribution zone adjacent the reaction zone to receive a heating and reducing fluid produced from a fluid fuel burned in a deficiency of oxygen-bearing gas and having a pressure sufficient to traverse the reaction zone, the calcining zone and the heating and drying zone with a residual remaining pressure;
(e) passing the raw material through a gas sealing zone adjacent the gas distribution zone;
(f) splitting the flow of the sintered raw material in the gas seal zone into two channels, each channel having a constricted passage in the direction of the flow of the raw material to produce a pressure drop through such gas seal zone greater than the original pressure in such heating and reducing fluid;
(g) passing the sintered raw material through a cooling zone adjacent the gas seal zone to cool the sintered raw material under reducing conditions;
(h) receiving the heating and reducing fluid at the residual remaining pressure in a cooling plenum in the cooling zone;
(i) retaining the raw material in the cooling zone while emitting the heating and reducing fluid from the cooling plenum into the cooling zone;
(j) retaining the raw material in the cooling zone while emitting the heating and reducing fluid from the cooling zone through an exit louver;
(k) passing the sintered raw material through a discharge zone adjacent the cooling zone; and
(l) discharging the raw material while sealing the discharge zone from the atmosphere.

3,615,081

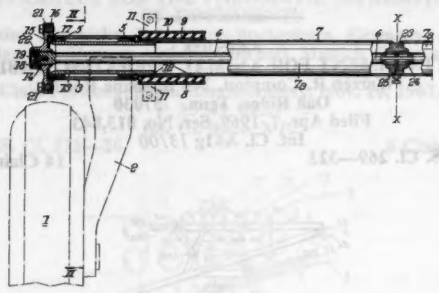
TORSION BAR SUSPENSION SYSTEMS FOR MOTOR VEHICLES

Raymond A. Ravenel, Sceaux, France, assignor to Societe Anonyme Andre Citroen, Paris, France

Filed July 22, 1968, Ser. No. 746,344
Claims priority, application France, Aug. 1, 1967, 116,541
Int. Cl. B60g *11/18, 11/60, 3/14*
U.S. Cl. 267—57 **8 Claims**

In a vehicle suspension system each wheel of a pair is rotatably mounted at one end of an arm, the other end of which is pivotally mounted on the end of a transverse tubular member. The arms are secured to the outer ends

of a torsion bar means extending within the transverse member and secured to the middle of the transverse member. The transverse member itself is connected to the



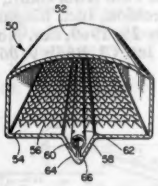
vehicle body through resilient blocks which insulate the vehicle body from vibration from the wheels and arms and act as additional torsion elements.

3,615,082

FURNACE MUFFLE

Jacob Howard Beck, Waban, Mass., assignor to BTU Engineering Corporation, Waltham, Mass.

Filed Sept. 2, 1969, Ser. No. 854,648
Int. Cl. F27b *5/04*
U.S. Cl. 263—41 **5 Claims**



A furnace muffle of unique welded construction and especially adapted for operation at extreme operating temperatures. The muffle is formed as an elongated tubular member having one or more gas pipes integrally formed therein to introduce a gaseous atmosphere within the muffle. The entire muffle structure including the gas pipes is formed of a metal which has experienced the same work history during fabrication, and individual elements of the muffle structure are welded in a unique manner to provide a unitary muffle construction capable of superior operation at elevated temperatures.

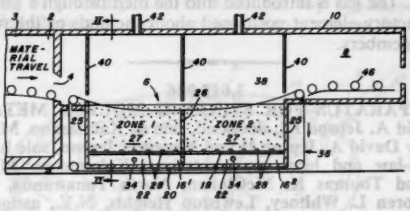
3,615,083

FLUIDIZED BED METHOD AND APPARATUS FOR CONTINUOUSLY QUENCHING COILED ROD AND WIRE

Jerome Feinman, Monroeville, and Richard L. Sallo, Greensburg, Pa., assignors to United States Steel Corporation

Filed July 2, 1969, Ser. No. 838,562
Int. Cl. C21d *9/56*
U.S. Cl. 266—3 R **3 Claims**

Apparatus consisting of a chamber having a two-zone fluidized bed is utilized for quenching rod or wire in open-coil, continuous loop form to obtain a metallurgical patented structure consisting of fine pearlite, some coarse



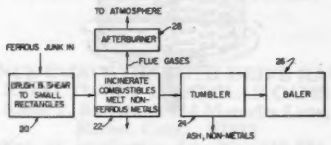
pearlite, and very little free ferrite in high carbon steel rod or wire.

3,615,084

PROCESS AND APPARATUS FOR SALVAGING JUNK MATERIAL

Fidelis J. Wasinger, 1972 S. Parker Road, Denver, Colo. 80222

Filed Jan. 8, 1969, Ser. No. 789,764
Int. Cl. C22b *7/00*
U.S. Cl. 266—33 **17 Claims**



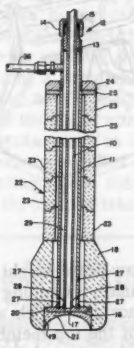
Process and apparatus for salvaging bulky junk material of principally ferrous content characterized by crushing to predetermined thickness and thence shearing same into relatively small rectangular pieces, continuously conveying the pieces through a furnace to combust entrained combustible materials and separate, by melting, non-ferrous metals, resulting in a final ferrous product for subsequent refining which contains a minimum of contaminants to be removed in the refining process. Optionally, undesired combustible air pollutants formed in the furnace are also oxidized before discharge into the atmosphere to thus permit practice of the invention in loci where air pollution is not tolerated.

3,615,085

APPARATUS FOR TREATING METALLIC MELTS

Gert P. Bernsmann, Pittsburgh, Pa., assignor to Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

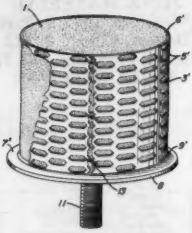
Filed Feb. 26, 1969, Ser. No. 802,518
Int. Cl. C21c *7/00*
U.S. Cl. 266—34 T **6 Claims**



Apparatus for treating a metallic melt, such as molten steel in a ladle is disclosed. The apparatus includes an inner tubular member, through which an additive is delivered to within the melt, and a coaxially disposed outer

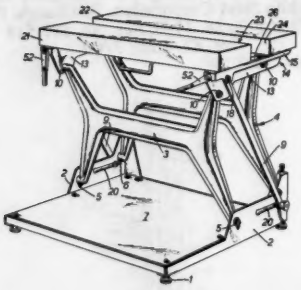
tubular member, the annulus between the two tubular members serving as a passageway for gas delivered to the melt. The gas is introduced into the melt through a porous refractory element positioned about the ends of the tubular members.

3,615,086
APPARATUS FOR STIRRING MOLTEN METAL
David A. Jepson III, deceased, late of Kalamazoo, Mich., by David A. Jepson II and Margaret Jepson, sole heirs-at-law and legal representatives, Kalamazoo, Mich., and Thomas K. McCluhan, North Tonawanda, and Loren L. Whitney, Lewiston Heights, N.Y., assignors to Union Carbide Corporation
Filed June 20, 1969, Ser. No. 836,691
Int. Cl. C21c 7/00
U.S. Cl. 266—34 PP 6 Claims



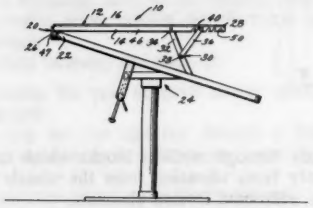
A porous plug assembly wherein the porous plug is provided with a gas impermeable bottom surface seal and a gas permeable side wall sheath.

3,615,087
WORKBENCHES
Ronald Price Hickman, "Badgers," Middle St., Nazeing, Waltham Abbey, Essex, England
Filed Mar. 3, 1969, Ser. No. 803,600
Claims priority, appplication Great Britain, Mar. 4, 1968, 10,484/68
Int. Cl. B25b 1/10, 1/24
U.S. Cl. 269—244 14 Claims



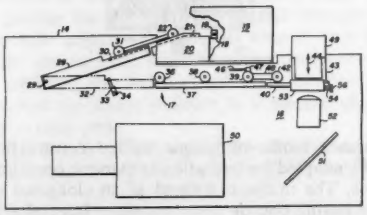
A workbench of saw-horse height has its top formed by a pair of longitudinally extending top members which form a working surface and which are carried by transverse supports. One of the top members is fixed with respect to the supports but the other is horizontally movable towards and away from the fixed top member to form a vise between the opposed vertical faces of the top members. Adjacent each end the top members are interconnected by screw threaded rods which are restrained against axial movement at their ends adjacent the fixed top members but which are received in nuts connected to the movable top member. The connection of the nut to the movable top member allows independent operation of the screw threaded rods to permit the gap between the vertical faces to be greater at one end than at the other.

3,615,088
ATTACHMENT FOR ANIMAL OPERATING TABLE
Warren R. Compton, 244 Brisbane Road, Oak Ridge, Tenn. 37030
Filed Apr. 7, 1969, Ser. No. 813,843
Int. Cl. A61g 13/00
U.S. Cl. 269—323 14 Claims



An attachment for a tiltable animal operating table comprising a board means which has one end that fits over the raised end of the table and which has adjustable legs for elevating the other end of the board means with the result that the overall elevation of the operating table can be raised.

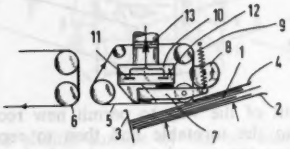
3,615,089
CARD TRANSPORT
Gerald J. Laughlin, Palo Alto, Calif., assignor to Singer-General Precision, Inc., Binghamton, N.Y.
Filed May 29, 1969, Ser. No. 828,923
Int. Cl. B65h 9/06
U.S. Cl. 271—3 2 Claims



The disclosed embodiment of the present invention is a mechanism for transporting an aperture card from a card reader, which reads the punched address on the card, to an optical scanning station, which scans the optical information in the film area of the card. The card reader reads the information in the form of punched holes on the card beginning with the left end and progressing toward the right end of the card, with the result that the card is ejected from the card reader with the left end leading. The present invention reverses the direction of travel of the cards ejected from the card reader such that the location of the aperture can be properly referenced from the right end of the card in the optical scanner. The direction of travel is reversed by means of a pivoted track section which accepts cards at one angular position and ejects cards in the opposite direction at a second angular position. The ejected card is received by a second track section which conveys the card to the optical scanning station. Each card is properly positioned in the optical scanning station by means of a pair of card edge guides and a card

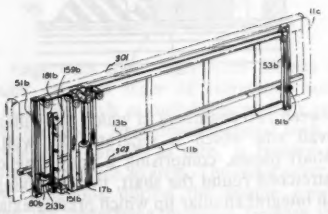
end stop. One card edge guide is movable to permit a pair of card extractors and a pair of rollers to remove the card edgewise from the scanning station.

3,615,090
APPARATUS FOR THE PNEUMATIC SEPARATION OF DOCUMENTS
Heinz Lomnicky, Baierbrunn-Buchenhain, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany
Filed Nov. 8, 1968, Ser. No. 774,422
Claims priority, application Germany, Nov. 10, 1967, P 15 49 892.7
Int. Cl. B65h *3/12*
U.S. Cl. 271—26 **8 Claims**



Apparatus for individually separating the uppermost document from a pile of such documents. The pile of documents is supported at an acute angle to a perforated suction tape. A suction arm alternately moves between the uppermost document in the pile and the suction tape so as to transfer the top document from the pile to the tape. In so doing the document is bent at an acute angle so as to avoid the double removal of documents. Suction air is provided to the arm during the transfer after which the supply to the arm is terminated to the arm and applied to the tape for removal of the separated document.

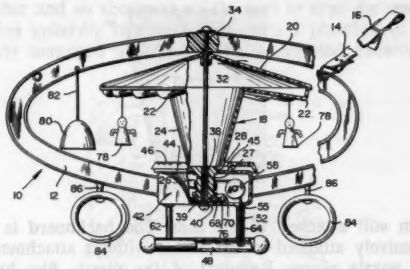
3,615,091
STRIP FEEDER
David L. McGee and David A. Skalbeck, Portland, Oreg., assignors to Plymak Company, Inc., Portland, Oreg.
Filed Apr. 18, 1969, Ser. No. 817,540
Int. Cl. B65h *1/00*
U.S. Cl. 271—62 **8 Claims**



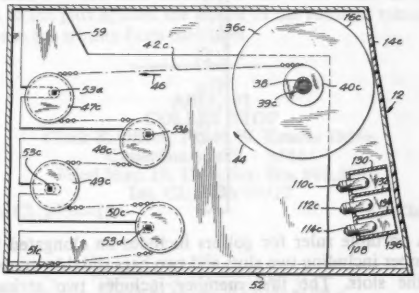
A strip feeder in which the strip capacity is nearly the full height of the feeder frame. The strip elevator is operated by a half-length cylinder through a mechanical advantage device. The upward pressure on the strips is controlled to avoid jamming as the elevator rises.

3,615,092
SPRING RESISTANT TYPE CRIB EXERCISING DEVICE WITH ROTATING CAROUSEL
Albert Stubbmann, Franklin Lakes, N.J., assignor to Kohner Bros., Inc., East Paterson, N.J.
Filed Feb. 16, 1970, Ser. No. 11,504
Int. Cl. A63b *21/10, 21/02*
U.S. Cl. 272—83 A **14 Claims**

A carousel adapted to be mounted in a crib above an infant lying therein. Beneath the carousel is a trapeze bar. The carousel is rotatably mounted on a frame suspended by straps which are tied to the side rails of the crib. When the child pulls down on the trapeze bar, the carousel is caused to spin while at the same time storing energy in a spring. The carousel has toy figurines suspended therefrom and centrifugal force causes the figurines to rotate in a radially outward path. Striker bells are positioned in this path so that the rotating figurines strike the bells. When the child releases the trapeze bar, the stored energy in the spring spins the carousel in the opposite direction and raises the trapeze bar.



3,615,093
CHANCE INDICATOR WITH DRIVE HAVING EFFECTIVELY DISSIMILAR CAMS
Elton T. Barrett, 40234 Marcella Lane, Hemet, Calif. 92343
Continuation of application Ser. No. 658,274, Aug. 3, 1967. This application Dec. 3, 1969, Ser. No. 876,173
Int. Cl. A63b *71/00*; A63f *1/18*
U.S. Cl. 273—143 R **5 Claims**

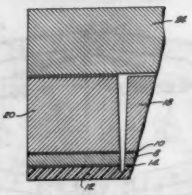


In an electrically operated market game, having windows or other means for selecting particular indicia displayed on a plurality of motor driven fluctuating dials rotatably mounted on a shaft and driven by means of a drive mechanism having parallel shafts, each having at least one eccentric cam, a drive chain or other flexible tensile member attached to a base and drawn around the eccentric cam on each shaft and attached to a respective dial so that when the cams turn so as to increase or decrease their radii, the chain is pulled or slackened and the dials move; and a spring return mechanism which pulls the dials back against the chain to take up slack.

3,615,094
METHOD OF PRODUCING AN INLAY PUZZLE
Gordon P. Connor, Wausau, Wis., assignor to Connor Forest Industries, Wausau, Wis.
Filed May 11, 1970, Ser. No. 36,338
Int. Cl. A63f *9/10*
U.S. Cl. 273—157 R **4 Claims**

The stock from which puzzle pieces and frame are cut has thin picture and plastic film plies laminated to its outer face. Strong adhesive holds the picture to the stock

but "low-tac" adhesive is used for the film ply. Working from the rear face of the stock with a high-speed router of small section, the puzzle pieces and the pictures thereon are severed from each other and from the frame leaving



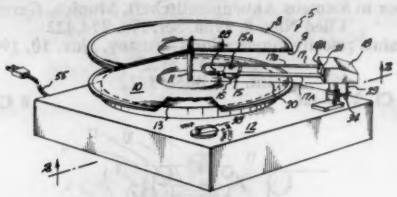
them still attached to the film. The backboard is then adhesively attached to the frame without attachment to the puzzle pieces. Removal of the plastic film by the customer leaves the puzzle pieces free in the frame.

3,615,095
GOLF STANCE RULER
Lucien Lafontaine, 637 Place Fleury, Montreal 357, Quebec, Canada
Filed Sept. 12, 1969, Ser. No. 857,469
Int. Cl. A63b *69/36*
U.S. Cl. 273—187 R **3 Claims**

A portable ruler for golfers includes an elongated first member including two slots and two bars slidably mounted in the slots. The first member includes two series of numbered graduations designating the different widths of golfers' shoulders. Each slideable bar includes a series of graduations and numbers corresponding to those conventionally used to identify gold clubs. When an end of each bar is properly aligned with a particular shoulder width indicating graduation, to accommodate a particular golfer, the numbers on the respective bars point to the proper placement positions of one of the golfer's feet and the golf ball for the various clubs. A fixed mark on the first member indicates the proper position of the golfer's other foot.

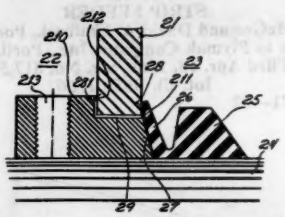
3,615,096
RADIAL ARM PHONOGRAPH WITH RECORD CHANGER
Elwood G. Norris, 2505 20th E., Seattle, Wash. 98102
Continuation-in-part of application Ser. No. 600,338, Nov. 15, 1966, now Patent No. 3,418,435. This application Dec. 20, 1968, Ser. No. 785,555
Int. Cl. G11b *17/08, 3/10*
U.S. Cl. 274—10 R **22 Claims**

Disclosed is a phonograph having a pickup head supported on a tone arm which remains fixed during record play with the pickup stylus contacting the record groove and transiting a path coincident with a radius of the record as the pickup head moves along the tone arm. Automatic head position control systems are shown for sensing the approach of the stylus to the end of the record, raising the stylus from the record, and reeling the head along the tone arm to the initial playing position. A tone arm positioning system is shown for turning the



tone arm out of the way to permit new records to be lowered onto the turntable and then to reposition the tone arm over the record to be played. A record stack sensing system cooperates with the tone arm rotation system to gauge the height of the record to be played and to position the tone arm at the desired height for playing such record.

3,615,097
SEAL ASSEMBLY
Sven-Erik Malmstrom, Fabriksgatan, Sweden, assignor to Forsheda Gummifabrik Aktiebolag, Forsheda, Sweden
Filed Feb. 3, 1969, Ser. No. 796,125
Claims priority, application Sweden, Feb. 2, 1968, 1,379/68
Int. Cl. F16j *15/32*
U.S. Cl. 277—95 **8 Claims**

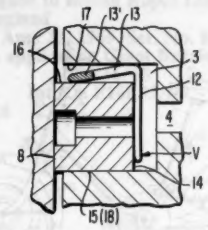


Seal between two chambers in which two different pressures prevail and which is separated by wall through which a shaft passes, comprising a body ring of rubber which is stretched round the shaft, thereby fixing in right position an integral annular lip which presses axially along an annular sealing surface against the side of the wall where the prevailing pressure is highest by means of the inherent tension of the lip and due to the influence of the ambient pressure characterized thereby that the free surface of lip facing the wall is little compared with the radial thickness of the body ring.

3,615,098
OIL SCRAPING PISTON-RING ASSEMBLY
Eisuke Sugahara, Tokyo, Japan, assignor to Nippon Piston Ring Co., Ltd., Tokyo, Japan
Filed Mar. 26, 1970, Ser. No. 22,959
Claims priority, application Japan, May 19, 1969, 44/37,991
Int. Cl. F16j *9/06*
U.S. Cl. 277—143 **4 Claims**

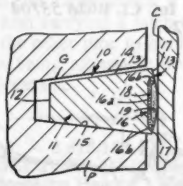
An oil scraping piston-ring assembly which has its piston-ring internal surface disposed perpendicular to the upper or lower surface thereof or inclined upwardly or downwardly. A compression element of steel strip mate-

rial has a plurality of oil passing slits and is formed into a ring having a cross-sectional configuration of either V or L shape. The compression element has two portions, one rising vertically or obliquely and the other extending obliquely outwardly or horizontally outwardly. When the piston-ring is assembled with the compression element and is inserted in a piston groove, the compressive forces



between the sliding surface of the oil scraping piston-ring and the inside surface of the cylinder and also between the upper or lower surface of the piston groove and the corresponding surface of the piston-ring are greatly strengthened and the leakage of the lubricating oil therethrough into the combustion chamber is substantially decreased.

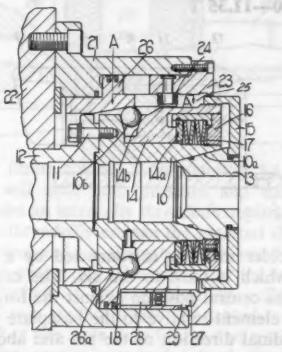
3,615,099
MULTIPLE LAYER FACED PISTON RINGS
Herbert F. Prasse, Town and Country, Mo., assignor to Ramsey Corporation, St. Louis, Mo.
Filed Feb. 26, 1969, Ser. No. 802,350
Int. Cl. F16j *9/22*
U.S. Cl. 277—235 A **7 Claims**



Piston rings with multi-layer hard facings composed of an outer break-in layer of refractory porous scuff resisting material, such as molybdenum, over and bonded to a more refractory, less porous material such as a tungsten carbide alloy which, in turn, is bonded to a base ring body material such as iron. The outer layer, although refractory, functions during the engine run-in period better than the underlying material because it is softer and more porous, and as it wears away and oxidizes, a more refractory less porous underlying layer comes into operation to insure long lasting highly efficient sealing of the compatible ring and cylinder surfaces formed during the break-in operation of the engine.

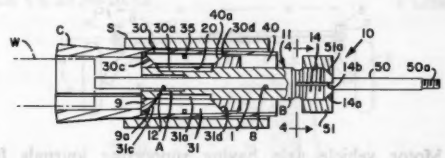
3,615,100
CHUCKS
John Banner, Stourport, England, assignor to Edward Williams, Birmingham, England
Filed Apr. 23, 1969, Ser. No. 818,741
Claims priority, application Great Britain, May 21, 1968, 24,151/68
Int. Cl. B23b *31/30*
U.S. Cl. 279—4 **3 Claims**

The invention relates to a fluid operable chuck comprising in combination a central part adapted for connection to a spindle whereby the chuck can be rotated, said part being shaped internally (as at **10***a*) to co-act with the complementary surface of a collet whereby movement of the collet towards the spindle will cause the collet to be closed, a tubular member slidable on the part, and a seating portion on the member for engagement with the collet, resilient means acting between a shoulder on the member and an abutment on the part to urge the seating portion inwardly relative to the part, a plurality of annularly arranged anti-friction balls disposed between a



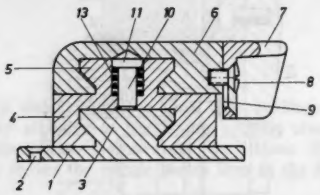
pair of complementarily inclined surfaces on the part and member respectively, a relatively fixed cylinder surrounding the part and member, and a fluid operable annular piston in the cylinder, the piston having a conical internal surface for co-action with the balls whereby movement of the piston in one direction will move the balls radially inwards between said surfaces to move the member relative to the part against the action of the resilient means to release the seating from the collet.

3,615,101
COLLET STOP
Clark E. Oliver, 10849 W. Estates Drive, Cupertino, Calif. 95014
Filed Mar. 19, 1969, Ser. No. 808,500
Int. Cl. B23b *13/12*
U.S. Cl. 279—15 **13 Claims**



A collet stop with detachable axially extending collet engaging members retained on an externally threaded cylindrical body by an O-ring. An annular locking member disposed in threaded engagement with the cylindrical body has a tapered end for controlling the extent of the collet engaging members projecting from said body for pressing the collet engaging members into locking engagement with the inner cylindrical wall of a collet. A second annular locking member in threaded engagement with a tapered yieldable threaded end of the cylindrical body retains an adjustably positioned, optionally employed, work stop rod at one end of the cylindrical body opposite from the end of the cylindrical body that holds an optionally employed solid work stop. In a modification of the collet stop, an expansible sleeve is used as the collet engaging member for locking the collet stop with the collet.

3,615,102
SAFETY TOE IRON FOR SKI BINDINGS
Hannes Marker, 51–53 Hauptstrasse, 81 Garmisch-Partenkirchen, Germany, and Ernst-Richard Schriewer, Garmisch-Burgrain, Germany; said Schriewer assignor to said Marker
Filed Mar. 18, 1969, Ser. No. 808,055
Claims priority, application Germany, Mar. 19, 1968, P 16 78 282.4
Int. Cl. A63c *9/00*
U.S. Cl. 280—11.35 T **12 Claims**



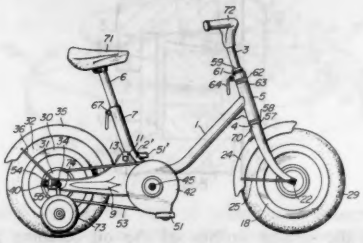
A soleholder member is connected by a carrier to a baseplate which is fixed to the ski. The carrier is movable from its central position against the force of at least one spring element relative to the baseplate transverse to the longitudinal direction of the ski and about a vertical axis. The soleholder member is movable relative to the carrier in the longitudinal direction of the ski and about a vertical axis. A locking device is interposed between the carrier and the soleholder member and serves to hold the latter in its normal position relative to the carrier and to automatically unlock the soleholder member when the carrier has performed a predetermined movement relative to the baseplate from its central position.

3,615,103
MOTOR VEHICLE AXLE WITH WHEELS GUIDED BY MEANS OF PULL RODS
Ekkehard Döhring, Wolfsburg, and Fritz Schael, Ehmen, Germany, assignors to Volkswagenwerk AKG., Wolfsburg, Germany
Filed Nov. 18, 1969, Ser. No. 877,619
Claims priority, application Germany, Nov. 19, 1968, P 18 09 698.5
Int. Cl. B60g *11/18*
U.S. Cl. 280—124 **8 Claims**

Motor vehicle axle having supporting journals for pull rods mounted one inside the other and elastic bearings on the vehicle for supporting the outside ends of the journals.

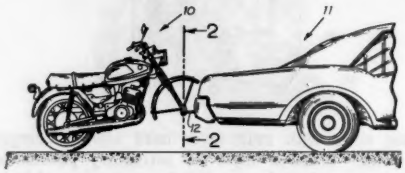
3,615,104
COLLAPSIBLE BICYCLE
Kei Fujiyoshi, Toyonaka-shi, Kotaro Hata, Nara-shi, Toshikazu Fujii, Yao-shi, Tsunemitsu Yaso, Sakai-shi, Katsuji Kagayama, Osaka, Hiroshi Fujimoto, Yao-shi, Sigehiro Houjiyou, Sakai-shi, Tosimi Otuka, Tondabayashi-shi, and Sigeru Morita, Sakai-shi, Japan, assignors to Matsushita Electric Industrial Co., Inc., Osaka, Japan
Filed Dec. 10, 1969, Ser. No. 883,805
Claims priority, application Japan, Dec. 11, 1968, 43/92,499, 43/92,501, 43/92,502
Int. Cl. B62k *15/00*
U.S. Cl. 280—287 **4 Claims**

A bicycle of the present invention comprises a body including a front body section and a rear body section, said front body section comprising a pipe member having a connecting means for a handle and a front fork at its front end and a connecting means for a seat at its rear end, said pipe member being arcuately curved at its intermediate portion, said rear body section being provided at its rear ends with a bearing portion for a rear



wheel and at its front end with a chevron shaped portion, said chevron shaped portion being provided at its forward side with a forwardly opening recess and at its bottom side with a portion for receiving a crankshaft, said front and rear body sections being removably connected together, so that they can readily be assembled or disassembled prior to or after use of the bicycle.

3,615,105
MOTORCYCLE HITCH
Samuel Steven Harris, Rte. 1, Selma, Ind. 47383
Filed June 18, 1969, Ser. No. 834,257
Int. Cl. B62d *53/04*
U.S. Cl. 280—292 **5 Claims**



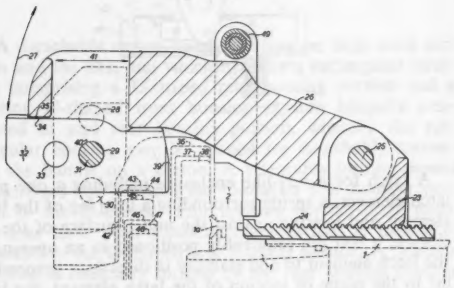
A motorcycle hitch replacing the ball of the trailer hitch on an automobile. The motorcycle hitch includes a cylindrical tube which is fixed to the front fork of the motorcycle by the front axle bolt of the motorcycle after the front wheel of the motorcycle has been removed. A bolt has its head welded to the central portion of the tube and, along with a lock washer, fixes the tube to the trailer hitch.

3,615,106
MANUFACTURE OF HARD COVERED BOOKS
Thomas P. Flanagan, Green Brook, and Paul P. Puletti, Glen Gardiner, N.J., assignors to National Starch and Chemical Corporation, New York, N.Y.
No Drawing. Filed Apr. 4, 1969, Ser. No. 813,770
Int. Cl. C08f *43/08*
U.S. Cl. 281—21 **5 Claims**

A method for binding hard covered or edition bound books wherein the hot melt adhesive composition which is utilized comprises a blend of (a) a copolymer of ethylene with either vinyl acetate or an alkyl acrylate comonomer, (b) a tackifying resin, (c) polyethylene, and (d) a

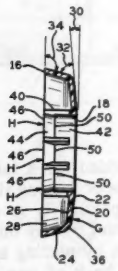
diluent. The described compositions exhibit a high degree of permanent set which is particularly useful in binding rounded, hard covered books.

3,615,107
PIPE COUPLINGS
Arthur L. Paddington, Thorpe Willoughby, near Selby, England, assignor to British Ropes Limited, Doncaster, Yorkshire, England
Filed Aug. 12, 1969, Ser. No. 849,391
Claims priority, application Great Britain, Aug. 13, 1968, 38,726/68
Int. Cl. F16l *23/00*
U.S. Cl. 285—18 **5 Claims**



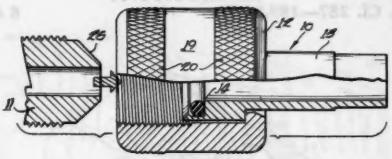
A pipe coupling for connecting together a pair of flanged pipes, comprising several arms pivoted on a support member arranged in screw-threaded engagement with one pipe behind its end flange so that it is axially movable on the pipe, each arm carrying a latch engageable behind the end flange of the other pipe to hold the two pipes together, the latches being adjustable on the arms to suit end flanges of different size.

3,615,108
ESCUTCHEON PLATE
Stephen E. Toth, Brooklyn Heights Village, Ohio, assignor to Sajar Plastics Inc., Middlefield, Ohio
Filed Mar. 24, 1969, Ser. No. 809,551
Int. Cl. F16l *5/00*
U.S. Cl. 285—46 **7 Claims**



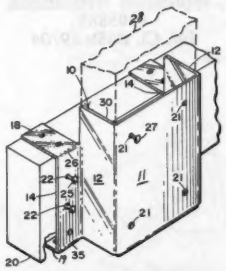
An escutcheon plate for use with plumbing fixtures is molded in one-piece of synthetic plastic material. The plate has a central circular hole through which a pipe or the like is received. A plurality of resilient fingers project rearwardly from the plate adjacent the hole. The fingers include gripping portions projecting radially inward and lying on the circumference of a circle having a smaller diameter than the diameter of the hole.

3,615,109
COUPLER FITTING FOR USE WITH BOTH VACUUM AND PRESSURE SYSTEMS
Gregory Brinda, 107 Long Ave., and Thomas J. Crain, 109 Long Ave., both of North Aurora, Ill. 60542
Filed Aug. 14, 1969, Ser. No. 849,962
Int. Cl. F16l *19/02*
U.S. Cl. 285—332.2 **14 Claims**



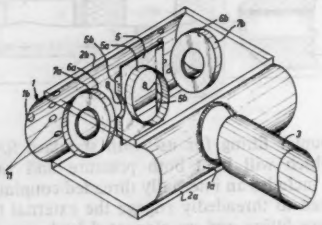
A coupler fitting for use with standard SAE flare fittings which will hold both pressure and vacuum. The coupler includes an internally threaded coupling nut which is adapted to threadedly engage the external threads of a male flare fitting and an elongated barb provided with a central bore therethrough. The interior of the forward end of the barb includes a frusto-conical inwardly and rearwardly flared stop surface which is adapted to mate with the flared end of the male flare fitting, and a circumferentially extending groove is provided in the barb adjacent the frusto-conical stop surface. The groove has a front wall which curves outwardly and rearwardly from the flared surface of the male fitting and a rear wall which extends radially inwardly beyond the innermost point of the front wall. An O-ring is snugly received by the groove and has a thickness substantially the same as the axial distance between the front and rear groove wall. The O-ring extends inwardly beyond an imaginary extension of the frusto-conical stop surface across the groove and is compressed into the groove by the flared end of the male flare fitting as the male flare fitting mates with the frusto-conical surface.

3,615,110
DEMOUNTABLE SOCKETS FOR GUARDRAIL POSTS
James E. Fugate, 9740 SW. 167th St., Perrine, Fla. 33156
Filed Apr. 21, 1969, Ser. No. 817,951
Int. Cl. F16b *7/00*
U.S. Cl. 287—20.95 **1 Claim**



A demountable socket for guardrail posts having a front and pair of sidewalls forming an opening for receiving a guardrail post with a bottom wall extending at right angle with the front wall and in spaced relation with the sidewalls, and tabs for fastening the socket to the sides of a purlin extending outwardly at right angle along the free edges thereof with upper portions separated from the sidewalls and lower portions extending beyond the lower edge of the sidewalls, with both upper and lower portions positioned at right angle to the tabs and parallel to the bottom wall for further fastening the socket to the upper and lower surfaces of the purlin.

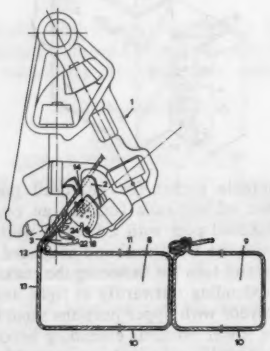
3,615,111
METHOD OF ASSEMBLING TWO TUBULAR MEMBERS IN ENCASTRÉ RELATIONSHIP
Albert Grosseau, Chaville, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France
Filed Oct. 16, 1969, Ser. No. 866,893
Claims priority, application France, Oct. 25, 1968, 3,572
Int. Cl. F16b *3/00*
U.S. Cl. 287—189.36 R 8 Claims



An assembly of two tubular members in encastré relationship includes a first tubular member formed by two semi-shells one of which has a flared aperture for the receipt of a second tubular member. That end of the second tubular member which lies within the first is secured to a sheet member or partition, edges of which are secured to flanges forming parts of the semi-shells. On either side of this partition two further partitions are disposed laterally which are secured to the internal surface of both semi-shells and to end flanges of the first mentioned partition member.

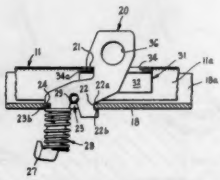
The method of assembly includes inserting the second tubular member into the flared aperture of one of the semi-shells welding the inserted end into the first mentioned partition and subsequently welding the partition to the flanges of the semi-shells and welding the laterally disposed partitions to the first mentioned partition and to the interior surfaces of the semi-shells.

3,615,112
BALER KNOT TYING MEANS
Gerhardus Minke, Appingedam, Netherlands, assignor to Ter Borg & Mensinga's Machinefabriek N.V., Appingedam, Netherlands
Filed Apr. 25, 1969, Ser. No. 819,220
Claims priority, application Netherlands, Apr. 25, 1968, 6805885
Int. Cl. B65h *69/04*
U.S. Cl. 289—13 3 Claims



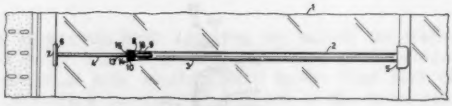
A baler of the kind comprising a baling chamber and a tying device including a movable needle and a knotter, characterized by a clamping device capable of clamping a twine, passed from the baling chamber to the knotter, in front of the entrance to the knotter.

3,615,113
ENCLOSURE LATCH
Christian De Visser, Clinton, Ill., assignor to General Electric Company
Filed Oct. 17, 1969, Ser. No. 867,314
Int. Cl. E05c *19/12*
U.S. Cl. 292—128 6 Claims



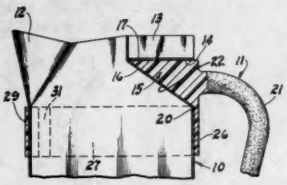
A latch for a box-like enclosure including a one piece latch element, a spring surrounding a long leg of the latch element and bearing against the under surface of the enclosure, a roll pin removably positioned in an opening of the latch element to add stability in directions perpendicular to the plane of motion of the latch element, the latch element further having a shoulder engageable with a side wall of the slot of the enclosure receiving the latch element to prevent the latch element from being pulled out of the slot and having an upper hook formed integrally therewith capable of engaging the cover portion of the enclosure to accomplish the latching function.

3,615,114
BURGLAR PROOF LOCK FOR SLIDING GLASS DOORS
Anthony J. Harris, 4712 NW. 168th Terrace, Opa-Locka, Fla. 33054
Filed Oct. 22, 1969, Ser. No. 868,457
Int. Cl. E05c *17/04, 19/18*
U.S. Cl. 292—288 5 Claims



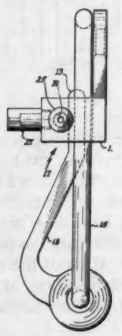
Apparatus is provided for a safe, inexpensive, and almost effortless means of locking sliding glass doors in the closed position. Apparatus is so constructed whereas to be shake and pry proof by any outside efforts. Apparatus is put into operation by placing apparatus at the desired height between the back of one glass door frame, and the front side of the other glass door frame, and extending apparatus between them. Apparatus is so designed as to automatically lock itself at any length within its limits. Apparatus is constructed of a piece of tubing out of which a solid rod telescope in or out to the desired length. Both ends of apparatus are so designed as to fit onto, and against sliding glass door frame, and once placed in the desired position, will stay there until unlocked and removed. Once place into proper position, sliding glass doors cannot be opened until apparatus is removed.

3,615,115
DETACHABLE CARTON HANDLE
James B. Simms, 8441 Birch Road, Taylor, Mich. 48180
Filed May 4, 1970, Ser. No. 34,383
Int. Cl. A47b 95/02
U.S. Cl. 294—31.2 3 Claims



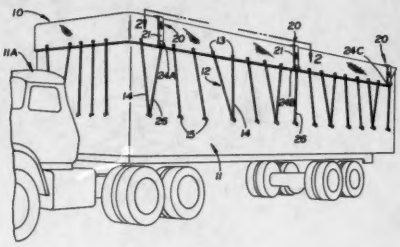
A detachable carton handle for use on large milk cartons and the like, and which includes a rectangular housing comprising a U-shaped rear housing portion and a mating U-shaped front housing portion hingedly connected to said rear housing portion, whereby the rectangular housing may be opened for detachably mounting the handle on a carton. A releasable locking means is provided for securing the U-shaped rear housing portion to the U-shaped front housing portion after these portions have been mounted on a carton. A handle is attached to the U-shaped rear housing portion. A retainer member is integrally formed on the rear housing portion for insertion into the opening on one side of the upper end of a carton under the top seal joint at a point opposite to the pouring lip of the carton.

3,615,116
PELICAN HOOK REMOTE RELEASE MECHANISM
Sidney Rosenthal, Newton, James C. Payne, Bedford, and Hazard C. Benedict, Waltham, Mass., assignors to the United States of America as represented by the Secretary of the Air Force
Filed Mar. 25, 1969, Ser. No. 810,263
Int. Cl. B66c 1/34
U.S. Cl. 294—83 AE 1 Claim



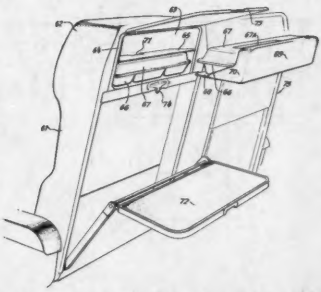
A pelican hook release mechanism having a housing attached to the upper portion of the frame member. A shear wire holds a release pin in position between two lobes on the housing. An explosion chamber and means for retaining an explosive squib or cartridge is disposed in one lobe and a pin receiver barrel is disposed opposite in the other lobe. The hook is released when the release pin is driven into the receiver barrel by the pressure from the explosion chamber in the squib retainer lobe.

3,615,117
ANTISAIL TARPAULIN
Paul E. Neidlinger, Akron, Ohio, assignor to East Akron Tarp & Ratchet Mfg. Co., Inc., Akron, Ohio
Filed Aug. 25, 1969, Ser. No. 852,780
Int. Cl. B60p 7/00
U.S. Cl. 296—100 15 Claims



A tarpaulin for use primarily on open top trailers is fastened to the trailer in a standard manner. The top of the tarpaulin, however, is provided with at least two laterally extending pockets open at both ends and spaced longitudinally along the tarpaulin at points found to bellow due to air pockets formed thereunder during use. A flat strap having a connecting means at each ends is threaded through each laterally extending pocket. The strap is then pulled tightly against the trailer and fastened thereto to prevent the occurrence of air pockets under the tarpaulin.

3,615,118
INSTALLATIONS FOR FOOD CATERING
Travis S. Buxton, Luton, England, assignor to Autair International Airways Limited, London, England
Filed Mar. 27, 1969, Ser. No. 811,127
Claims priority, application Great Britain, Dec. 4, 1968, 57,636/68; Mar. 3, 1969, 11,152/69
Int. Cl. A47c 7/62
U.S. Cl. 297—191 17 Claims

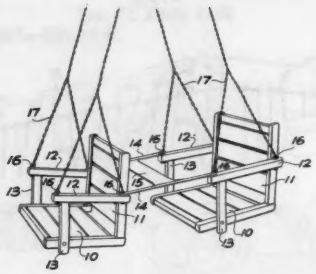


The invention described, concerned with the stowage and self-service of meals in vehicles, resides primarily in a vehicle seat back which has a head rest (being the upper part of the seat back and in practice usually defined by its own distinctive contour, which is of greater front-to-back thickness than the seat back proper) provided with stowage accommodation for one or more meal containers, stowed in a substantially horizontal attitude: the invention includes a vehicle equipped with seats having backs so characterised.

3,615,119
TANDEM SWINGS

Roy L. Irwin, 2712 Ridge Ave., Warren, Ohio 44484

Filed Mar. 28, 1969, Ser. No. 811,517
Int. Cl. A63g 9/02
U.S. Cl. 297—281 1 Claim

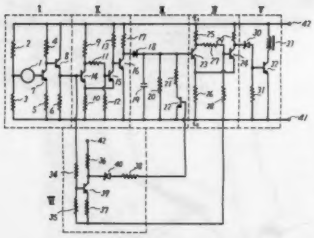


A pair of swings arranged in tandem relation and spaced with respect to one another are disclosed as being supported individually from an overhead support by means of flexible chains etc. This spacing between the tandem swing seats is such that when they are at their lowermost position relative to a single support point thereabove they are off center with respect to a vertical line through the common support point.

3,615,120
ANTI-SKID BRAKE CONTROL DEVICE

Hayao Yamazaki, Ikoma-gun, Nara-ken, and Tosiaki Okamoto, Hekikai-gun, Aichi-ken, Japan; said Yamazaki, assignor to Hayakawa Denkikogyo Kabushiki Kaisha, Osaka, Japan

Filed Sept. 10, 1969, Ser. No. 856,588
Claims priority, application Japan, Sept. 11, 1968, 43/65,349, 43/65,350
Int. Cl. B60t 8/12
U.S. Cl. 303—21 BE 7 Claims

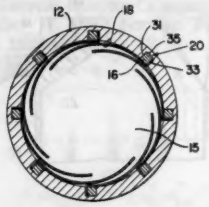


An anti-skid device for vehicles having a brake releasing circuit activated in response to a detected signal indicating retardation of the wheels in excess of a predetermined value and deactivated by a detected signal indicating acceleration of the wheels, a charge storage circuit being charged in response to a detected signal indicating retardation of the wheels and discharged only in response to a detected signal indicating acceleration of the wheels, and a circuit for making the brake releasing time shorter in response to a faster acceleration as detected by the acceleration-retardation signal detector.

3,615,121
BEARING FOIL ANCHORING ARRANGEMENTS

Morris A. Barnett, Palos Verdes Estates, Edward L. Edlefsen, Los Angeles, and Robert D. James, Gardena, Calif., assignors to The Garrett Corporation

Filed Apr. 1, 1969, Ser. No. 811,951
Int. Cl. F16c 17/16
U.S. Cl. 308—9 11 Claims

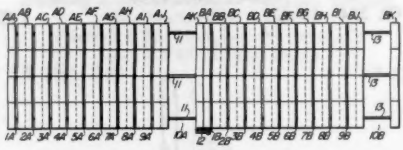


A foil anchoring arrangement for a fluid foil bearing is described especially as related to journal type and thrust type bearings. The arrangement includes a pin having a rectangular cross section and a foil which is spot welded to one surface. A channel in a stationary element of the bearing is provided to receive the pin partially wrapped by the foil and maintain it from rotating under the forces encountered by the foil during bearing operation.

3,615,122
SHIFTABLE STACK ASSEMBLY OPERATING SYSTEM

Han-Ichiro Naito, Akishima-shi, and Tsuneo Yamaguchi, Tokyo, Japan, assignors to Elecompack Company Limited, Tokyo, Japan

Filed Feb. 12, 1969, Ser. No. 798,580
Claims priority, application Japan, Feb. 15, 1968, 43/9,157; Mar. 5, 1968, 43/13,799; June 13, 1968, 43/40,246; Oct. 5, 1968, 43/72,776; Dec. 7, 1968, 43/89,832
Int. Cl. A47b 53/00
U.S. Cl. 312—199 12 Claims



A system for operating a shiftable stack assembly which is so designed that a desired aisle is automatically formed in accordance with a position card on which the storage position of an article accommodated in the stack assembly and desired to be taken out therefrom is previously recorded or by operating keys on a keyboard in accordance with a code number representative of the storage position information, or the operation of the shiftable stack assembly is restricted by a qualification, and further the date of operation, the operator, storage position, etc. are recorded automatically.

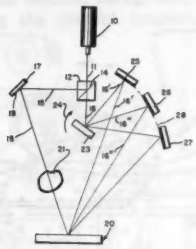
3,615,123
MULTIPLE EXPOSURE HOLOGRAPHIC SYSTEM

Ralph F. Wuerker, Palos Verdes Estates, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed May 26, 1969, Ser. No. 827,778
Int. Cl. G02b 27/00
U.S. Cl. 350—3.5 8 Claims

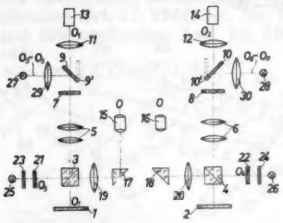
A holographic system for recording multiple-exposure holograms. The holograms are taken by a pulsed laser and each repetitive reference beam is deflected so that it reaches

the recording material at a plurality of discrete different angles. Each of the multiple-exposure recordings of the hologram may be reproduced by a reference beam having the same angle as that at which it was taken. The reference beam may, for example, be deflected by utilizing an electro-



optical retarder followed by a birefringent crystal for deflecting the beam in accordance with its direction of polarization. The paths of the reference beams for each discrete angle may be equalized by the provision of a plurality of reflectors disposed along an ellipse having the recording material and a first reflector as its focal points.

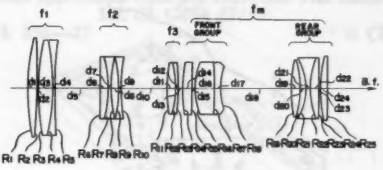
3,615,124
APPARATUS FOR MARKING POINTS IN PHOTOGRAMS
Peter Blankenburg, Dresden, Germany, assignor to Jenoptik Jena G.m.b.H., Jena, Germany
Filed May 16, 1969, Ser. No. 825,138
Claims priority, application Italy, May 16, 1968, 37,014/68
Int. Cl. G02b *27/32*
U.S. Cl. 350—10 **3 Claims**



An apparatus for marking points in photograms by means of optical rays comprising a viewing system, a measuring system and a marking system. The optical rays and the observation ray-path traverse one and the same optical means. A diaphragm serves as measuring mark in the viewing system and the measuring system and serves at the same time as a ray-limiting means in the marking system.

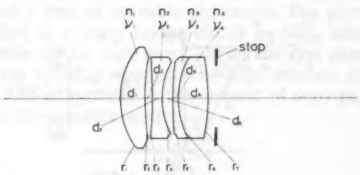
3,615,125
COMPACT TELEPHOTO TYPE ZOOM LENS
Takashi Higuchi, Yokohama-shi, and Soichi Nakamura, Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan
Filed June 26, 1968, Ser. No. 740,168
Claims priority, application Japan, July 4, 1967, 42/42,564
Int. Cl. G02b *15/14*
U.S. Cl. 350—184 **2 Claims**

A compact telephoto zoom lens is provided comprising a zooming system composed of three groups of converging, diverging and converging lenses from the side of the object, and a relay lens system connected to said zooming system. The relay lens system is composed of two groups, a front group and a rear group, which is characterized by carrying out the conversion of the main focal length



by moving the second group of the zooming system axially, and correcting the deviation of the image caused by said movement by the movement of the third group.

3,615,126
PHOTOGRAPHIC OBJECTIVE WITH A REAR STOP
Tadashi Kojima, Tokyo, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Chuo-ku, Tokyo, Japan
Filed Nov. 24, 1969, Ser. No. 879,415
Claims priority, application Japan, Nov. 27, 1968, 43/86,351
Int. Cl. G02b *9/20*
U.S. Cl. 350—227 **4 Claims**

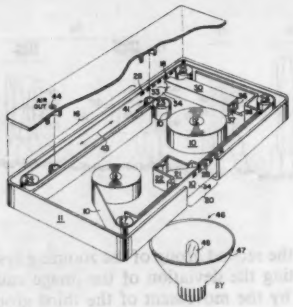


A photographic objective with a rear stop comprises three lens groups generally arranged in Tessar type, but the axial spacing between the lens groups is minimized while the thickness of the first and third lens groups is made relatively large to reduce the back focal length of the objective without increasing, if not eliminating, the vignetting at the rear stop for a ray having a half field angle approaching 30° and with simultaneously providing a favorable correction of various higher order aberrations.

3,615,127
MOTION PICTURE SYSTEM WITH COMPACT MULTIPURPOSE CASSETTE
Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.
Filed Aug. 28, 1968, Ser. No. 755,901
Int. Cl. G03b *23/02*
U.S. Cl. 352—78 **17 Claims**

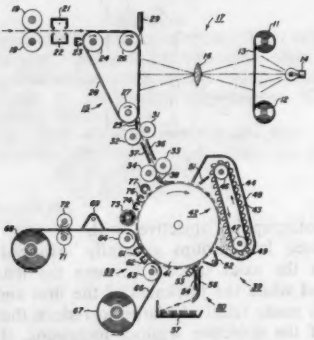
Motion picture apparatus including a compact film handling cassette adapted to facilitate film exposure operations when mounted in a camera and film processing and projection operations when mounted in a projector. Such cassette is supplied with a strip of unexposed photographic film interconnected between a pair of reels and includes a film gate to facilitate exposure and projection operations, a processing station and a drying station. Exposure of the film may be effected during a first advancement thereof from the supply reel to the takeup reel

across the film gate. Processing may be effected as the exposed film is returned through the processing station to the supply reel, and drying and exposure operations may be effected as it is once again advanced from the supply



reel, through the drying station and across the film gate, onto the takeup reel. Projection operations are also facilitated by a prism permanently mounted within the cassette.

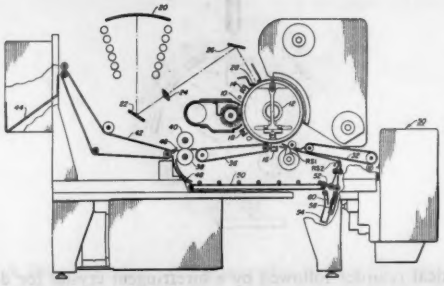
3,615,128
APPARATUS FOR ELECTROSTATIC PRINTING
Gopal C. Bhagat, Rochester, N.Y., assignor to Xerox Corporation, Rochester, N.Y.
Filed July 11, 1968, Ser. No. 744,183
Int. Cl. G03g *15/00*
U.S. Cl. 355—3 **5 Claims**



A method and apparatus for printing electrostatically including charging a photosensitive plate and exposing it to an optical pattern to form a latent image; placing the plate on a conveyor, developing the latent image and affixing the developed image to the plate to form a xeroprinting master; and charging the master, illuminating the master, developing the master and transferring from the master to a copy sheet the unfused toner to form a copy of the master on the copy sheet.

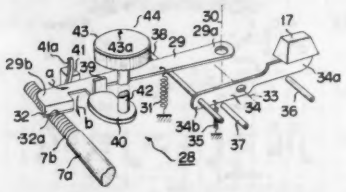
3,615,129
DUPLEXING XEROGRAPHIC REPRODUCING MACHINE WITH A COPY SHEET REVERSING STATION
William A. Drawe and John W. Wagner, Penfield, and John F. Wirley, Webster, N.Y., assignors to Xerox Corporation, Rochester, N.Y.
Filed Aug. 12, 1968, Ser. No. 752,075
Int. Cl. G03g *15/00*
U.S. Cl. 355—3 **12 Claims**

A xerographic reproducing device capable of being selectively operated in either of two modes. The first mode involves the conventional xerographic reproduction of originals onto one side of sequentially fed copy sheets. The second mode is a duplexing mode wherein the copy sheets are fed through an alternate path to sequentially and automatically produce printed material on both sides of copy sheets. Conversion to the duplexing mode is



achieved by the actuation of a single switch which diverts the movement of copy sheets with fused xerographic images to a duplexing tray. The original being copied may then be changed and the image bearing sheets, retained in the duplexing tray, fed through the reproducing apparatus again for creating images on the second side of the sheets.

3,615,130
WET TYPE PHOTOSTATIC DEVICE WITH LENGTH CONTROL
Shigeru Suzuki, Yokohama-shi, and Tadatoshi Sakamaki, Kawasaki-shi, Japan, assignors to Kabushiki Kaisha Ricoh, Tokyo, Japan
Filed Feb. 25, 1969, Ser. No. 802,024
Claims priority, application Japan, Feb. 29, 1968, 43/13,081
Int. Cl. G03g *15/00, 15/10*
U.S. Cl. 355—10 **2 Claims**

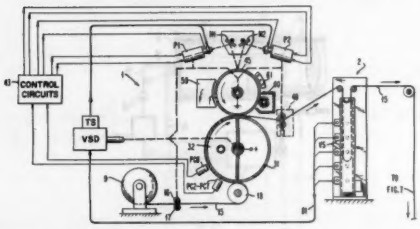


A wet type electronic photographic copying device in which a copy to be made is independently inserted in the device and visually aligned and superposed with an original to be subjected to passage through the device and corona discharge. A power supply drives roller means and energizes the corona discharge. Control means or the power supply includes a switch opened and closed by movement of a rocking lever that abuts a cam to determine the length of energization.

3,615,131
DOCUMENT PROCESSING MACHINE
Arthur J. Sable, Riverside, Calif., and Charles J. Bashe, Armonk, and Robert E. Sandt, Chappaqua, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Original application Jan. 26, 1966, Ser. No. 523,204, now Patent No. 3,493,301. Divided and this application Jan. 10, 1969, Ser. No. 803,516
Int. Cl. G03g *15/00*
U.S. Cl. 355—14 **17 Claims**

Apparatus for preparing a succession of documents in selected quantities of copies of each document, wherein each document has variable data content and may be

copied with foreign background data, wherein preparation is accomplished by printing the variable data in a required format together with control symbols identifying the required form background and indicating the number of copies to be made and distribution thereof, reading the control symbols, selecting the background data thereby, and overprinting the selected background in each selected document, reading the control symbols indicating the



number of copies to be made and printing the required numbers, of each document, adding to the copies the ordinal number thereof, inserting the documents and copies into piles in accordance with indications of the control symbols in ordinal numbers, and providing a variable speed drive along with variable intensity illumination in order to provide a constant photoconductor exposure level regardless of speed.

3,615,132

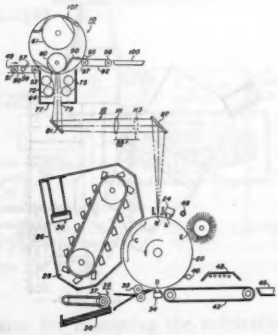
METHOD OF PRINTING MULTIPLE COPIES OF COMPOSITE INFORMATION ON STANDARD SIZE COPY SHEETS

Lyman H. Turner, Pittsford, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Original application Oct. 17, 1966, Ser. No. 587,110. Divided and this application Aug. 14, 1969, Ser. No. 850,141

Int. Cl. G03g *13/04*

U.S. Cl. 355—17 **3 Claims**



A method of printing multiple copies of composite information on standard size copy sheets comprising attaching an add-on slip bearing first information to a standard size sheet bearing second information, printing at least one copy of the composite information at an optically reduced predetermined size corresponding to a standard size copy sheet, and making multiple prints of the optically reduced copy of composite information at a 1:1 ratio on standard size copy sheets.

3,615,133

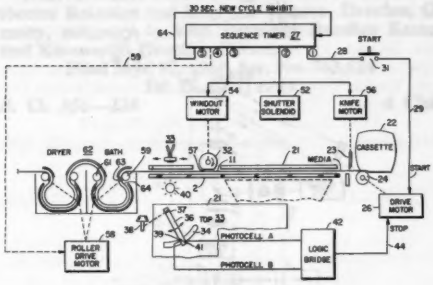
PHOTOCOPY APPARATUS

Henry N. Fairbanks and Daniel H. Robbins, Rochester, N.Y., assignors to Itek Corporation, Lexington, Mass.

Original application Oct. 17, 1966, Ser. No. 587,248, now Patent No. 3,472,590, dated Oct. 14, 1969. Divided and this application Apr. 24, 1969, Ser. No. 828,063

Int. Cl. G03b *27/58*

U.S. Cl. 355—27 **6 Claims**



A photocopy apparatus having a sheet feeding mechanism, a leading edge detector, and a pivoting copy holder. The sheet feeding mechanism consists of a flattened roller used to deliver an exposed sheet to a developer. The flattened portion of the roller obviates the neccessity of matching drive speeds between rollers in the developer and the sheet feeding roller. The edge detector consists of a pair of movable photocells. The photocells are coupled to a logic bridge circuit so that, when the leading edge of the copy paper covers the first photocell, the delivery roller is stopped. The edge detector is movable to allow adjustment in the amount of copy paper to be fed to the exposure station.

3,615,134

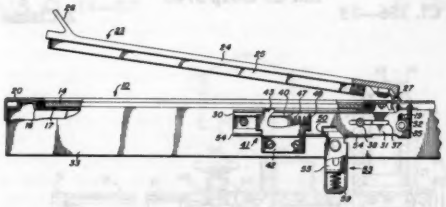
COUNTERBALANCED AND SELF-CLOSING PLATEN COVER

Dean R. Newcomb, Macedon, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Sept. 29, 1969, Ser. No. 861,880

Int. Cl. G03b *27/62*

U.S. Cl. 355—75 **4 Claims**

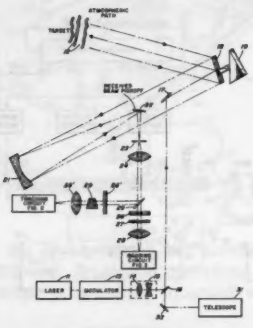


Apparatus is herein disclosed for controlling the positioning of a cover suitable for protecting a platen as utilized in automatic reproducing machines. The cover is operatively connected to a control mechanism to move a slide in a horizontal direction as the platen cover is raised or lowered. A pair of mechanically biased members act on the slide, and coact with each other to support the cover in a stationary position when the cover is raised above a predetermined position and automatically moves the cover into closure when it is placed below the predetermined position.

3,615,135
LASER RANGING WITH POLARIZATION MODULATION

Richard A. Frazer, King George, Va., assignor to the United States of America as represented by the Secretary of the Navy

Filed May 16, 1969, Ser. No. 825,225
Int. Cl. G01c 3/08
U.S. Cl. 356—5 7 Claims

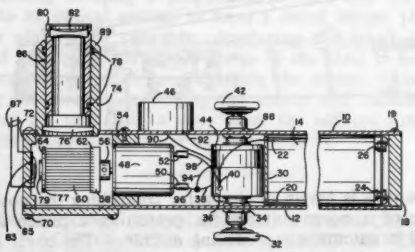


This invention is a ranging and tracking system which utilizes a laser. In the system the laser beam is passed through a modulator to a target. The beam is directed by a tracking mirror which also gathers the reflections of the beam. The reflected beam is directed to a tracking photomultiplier which converts the reflections to an electrical error signal and uses it to drive the tracking mirror. The reflected beam is also passed through a polarization analyzer to a range photomultiplier which triggers a range counter to stop counting. Initially, a pulsing circuit is operative to simultaneously pulse the modulator and start the range counter. The modulator shifts the polarization angle of a selected portion of the laser beam and the polarization analyzer will pass only that portion of the beam which has the shifted polarization angle.

3,615,136
STROBOSCOPE VIEWING DEVICE

Lawrence J. Kamm, San Diego, Calif., assignor to March 23rd Corporation, doing business as Minear Company, San Diego, Calif.

Filed Mar. 17, 1969, Ser. No. 807,799
Int. Cl. G01p 3/40
U.S. Cl. 356—25 2 Claims

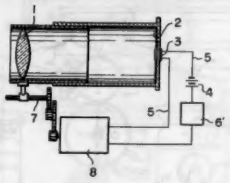


A stroboscope viewing device that has a group of parallel, spaced plates that are rotated at selectable and controlled speeds to provide stop motion viewing of a rotating or reciprocating object and that directs a separate pulsing light source onto the moving object in synchronism with the viewing of the object through the rotating plates.

3,615,137
FOCUSSING DEVICE FOR OPTICAL SYSTEM

Isao Yamaguchi and Tatsushi Kitanosono, Tokyo, Japan, assignors to Canon Camera Company Incorporated, Tokyo, Japan

Continuation-in-part of application Ser. No. 238,935, Nov. 20, 1962. This application Oct. 9, 1967, Ser. No. 678,475
Int. Cl. G01j 1/00
U.S. Cl. 356—122 3 Claims

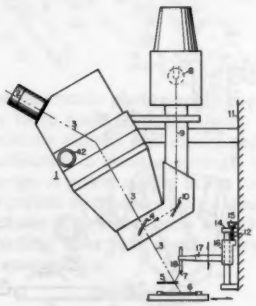


The present invention provides a focussing device for focussing the image of an object in a focal plane comprising an objective lens movable relative to the focal plane, a current measuring device, and an electrical circuit including a source of voltage interconnecting the cell and the device, the focal plane of the photoconductive cell being of a photoconductive material having a property specific to the photoconductive material used, the current measuring device measuring the extreme value of the current flowing through the circuit for the extreme value of the resistivity of the cell when the total light rays focus to a sharp image on the cell.

3,615,138
DICHROIC MIRROR ALIGNMENT SYSTEM

Donald G. Pedrotti, Cupertino, and Rainer Reimann, Saratoga, Calif., assignors to Hugle Industries Inc., Sunnyvale, Calif.

Filed Oct. 31, 1969, Ser. No. 872,976
Int. Cl. G01b 11/27; G02b 5/28
U.S. Cl. 356—153 6 Claims



An optical system for observing manipulation of two objects to be related in a predetermined manner; i.e., a microscope and a dichroic mirror to provide superimposed images of a flip-chip and of a substrate, which are to be bonded together after a desired positional relation between patterns for electrical connections on both are established. The optical axis of the microscope intersects the dichroic mirror such that a reflected image of the flip-chip and a transmitted image of the substrate are formed for viewing. Each have a distinctive color, aiding in the manipulation.

3,615,139
ARRANGEMENT FOR PHOTOELECTRIC DIMENSION MEASURING

Lars-Åke Boström, Huddinge, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Dec. 4, 1968, Ser. No. 781,026
Claims priority, application Sweden, Dec. 7, 1967, 16,806/67
Int. Cl. G06b *11/02, 11/10*
U.S. Cl. 356—160 4 Claims

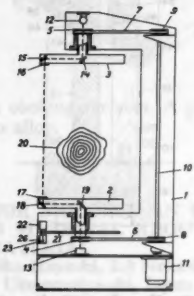
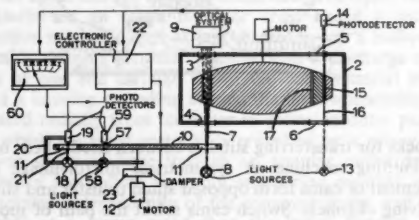


Photo-electrical measuring apparatus generates a light beam which passes across the gap of two rotating wheels while being parallel to the common axis of the wheels. The object whose dimension is to be measured passes through the gap. As the wheels rotate electric pulses are generated at rate of a given number per unit distance. These pulses are counted whenever the beam is blocked by the object.

3,615,140
APPARATUS FOR MEASURING THE REFRACTIVE INDEX OF A SOLUTION IN ROTATING CENTRIFUGE CELLS

Johan G. F. Doornekamp and Bauke S. Sieswerda, Geleen, Netherlands, assignors to Stamicarbon N.V., Heerlen, Netherlands

Filed Nov. 7, 1969, Ser. No. 874,908
Claims priority, application Netherlands, Nov. 8, 1968, 6815905
Int. Cl. G01n *21/24*
U.S. Cl. 356—197 10 Claims

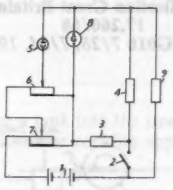


An apparatus for measuring the refractive index of a solution in a rotating centrifuge provided with a multicell rotor and with a selector circuit for observing a given cell with application of a light source continuously omitting radiation and a motor-operated rotary disc, serving as a gate, whose speed of revolution is derived from that of the rotor, both the rotor and the disc being equipped with means for the generation of pulses with a frequency that is directly proportional to the number of revolutions and wherein use is made of an electronic controller which feeds the disc drive with pulses of a frequency equal to that of the rotor pulses, unless said motor is rotating at too high a speed, while in the case of a synchronous or lagging speed of revolution the time duration of the pulses to be fed to the motor is reduced by the pulses generated by the disc, in so far as the latter pulses come within the time duration of the pulses to be fed to the motor, and the disc is coupled with a damper for the suppression of rotational vibrations.

3,615,141
PHOTOGRAPHIC EXPOSURE METER ARRANGEMENT WITH PHOTOCONDUCTIVE CELL

Hubertus Reimann and Siegfried Schutze, Dresden, Germany, assignors to VEB Pentacon Dresden Kamera- und Kinowerke, Dresden, Germany

Filed Sept. 30, 1968, Ser. No. 763,624
Int. Cl. G01j *1/44*
U.S. Cl. 356—226 4 Claims

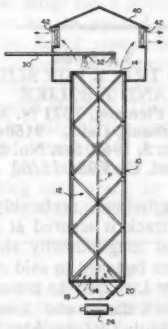


Exposure meter arrangement with photo-conductive cell and a battery feeding the latter, also a galvanometer the pointer zero position of which indicates the balancing of the measuring apparatus brought about by resistance attenuation elements, and thus the correct combination of the exposure factors according to brightness, wherein on the one hand the entire measuring apparatus including galvanometer is connectible through a switch to the battery and in that on the other hand when the battery is disconnected from the entire measuring apparatus a permanent current at the level of the self-discharge current of the battery is fed to the galvanometer through an auxiliary current path which is of high ohmic value in comparison with every resistance value of the measuring apparatus.

3,615,142
PRILLING TOWER

Lars-Olov Dahlbom, Garpenberg, Sweden, assignor to Kema Nord AB, Stockholm, Sweden

Filed Jan. 29, 1969, Ser. No. 794,976
Claims priority, application Sweden, Jan. 30, 1968, 1,234/68
Int. Cl. B29c *23/00;* B22d *23/08*
U.S. Cl. 18—2.7 11 Claims



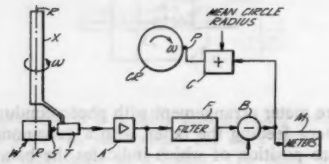
A prilling tower includes a shaft the walls of which are made of a flexible nonwettable corrosion resistant material having low thermal conductivity. The walls are pref-

erably formed of plastic material or plastic coated fabric. The walls may be employed for covering the shaft walls of a conventional prilling tower, or the walls may be attached to a rigid framework. In one form of the invention, the tower comprises at least two shafts having one shaft wall in common.

3,615,143
PROFILE TESTING

John Denzil Barr, Oadby, Richard Edmund Reason, Market Harborough, Thomas Charles Reeve, London, Robert Claude Spragg, Leicester, Arthur Tisso Starr, New Barnet, Peter Frederic Thomas Cryer Stillwell, Aldershot, and David John Whitehouse, Melton Mowbray, England, assignors to The Rank Organisation Limited, London, England

Filed Apr. 4, 1969, Ser. No. 813,649
Claims priority, application Great Britain, Apr. 10, 1968, 17,260/68
Int. Cl. G01b *7/28, 7/34, 19/26*
U.S. Cl. 33—174 **5 Claims**



In testing the circumferential surface of an object relative rotation is effected at an angular velocity between the object and a detector device which provides signals representative of the surface characteristics of the object around a closed circumferential path. The signals are passed through a filter device which passes the constant component and one or more selected harmonic components of the signals in accordance with a reference shape for the object. The filter device according to the invention has an effective impulse response such that the sum of the ordinates of this impulse response at times $(t+2\pi r/\omega)$, $o<t\leqslant 2\pi/\omega$, following an impulse input at $t=o$, where $r=0, 1, 2, 3 \ldots$ is of the form:

$$(a_0+2\cos(\omega t)+a_2\cos(2\omega t)+\ldots+a_m\cos(m\omega t))$$

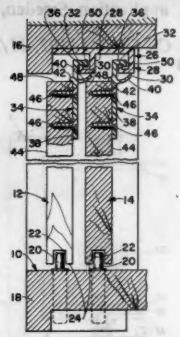
where $a_0\neq 2$ and $a_2 \ldots a_m$ individually have values of 2 or zero, and where the values of the ordinates of the impulse response are negligible for $r>3$. Preferably the impulse response has the form $(1+2\cos\omega t)$ for $o<t\leqslant 2\pi/\omega$ and zero elsewhere.

3,615,144
HANGER AND TRACK FOR SLIDING DOORS AND THE LIKE

Gordon J. Plemeng, 1321 N. Myer St., Burbank, Calif. 91506

Filed Dec. 3, 1969, Ser. No. 881,655
Int. Cl. E05d *13/02*
U.S. Cl. 49—411 **8 Claims**

An elongate longitudinal, preferably L-shaped cross section and plastic track is secured at an upper edge of a door opening and longitudinally slidably supports a door through hangers fastened to said door. Each hanger is inverted generally L-shaped in cross section engaging upwardly over a track flange and downwardly into said track with a resiliently deformably keeper projecting generally transversely underlying and adjacent said track. The keeper thereby normally restricts upward movement of the hanger to retain engagement between the hanger and track but is resiliently distortable upwardly against the track for permitting upward movement of the door and hanger to disengage said hanger from said track. The hangers may be formed unitary of plastic with the keepers

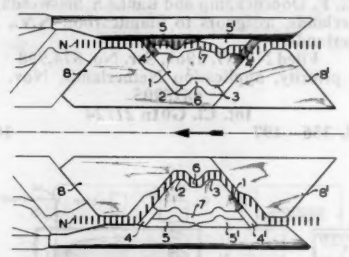


of reduced cross section for relative resiliency and the remainders of the hangers increased cross section for relative rigidity.

3,615,145
CAM LOCK FOR FLAT KNITTING MACHINE

Ernst Goller, Pfullingen, and Wilhelm Hadam, Reutlingen, Germany, assignors to H. Stoll and Company, Reutlingen, Germany

Filed Aug. 8, 1969, Ser. No. 848,513
Claims priority, application Germany, Aug. 9, 1968, P 17 85 099.6
Int. Cl. D04b *7/04*
U.S. Cl. 66—78 **10 Claims**



Locks for transferring stitches between needle beds of a flat knitting machine. A symmetrical mirror-image arrangement of cams form opposed stitch transfer and stitch receiving channels. Switch cams select the path of movement of the needle butts through the cams and hence determine the direction of stitch transfer, regardless of the direction of travel of the lock carriage.

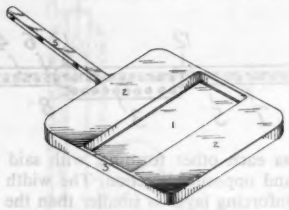
3,615,146
COMBINATION TOASTER AND FRYING PAN

James N. Reaben, 4539 Sunburst St., Bellaire, Tex. 77401

Filed Sept. 25, 1967, Ser. No. 676,985
Int. Cl. A47j *37/10*
U.S. Cl. 99—339 **1 Claim**

A cooking utensil which will permit the frying of bacon, hamburger, eggs, sausage, etc. while toasting

bread, buns, frozen waffles, etc. on an elevated surface free from bacon and other grease. The preferred shape is rectangular. The basic design is a depressed cooking area



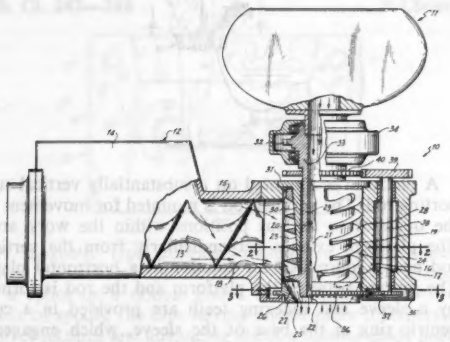
between two flat cooking surfaces. A preferred material is 1/16" aluminum alloy.

3,615,147

APPARATUS FOR MOLDING AN OUTER LAYER OF VISCOUS MATERIAL ABOUT A CORE OF ANOTHER MATERIAL

Torahiko Hayashi, 2-3 Nozawa-cho, Utsunomiya-shi, Japan

Filed Jan. 9, 1969, Ser. No. 790,099
Claims priority, application Japan, Jan. 13, 1968, 43/1,585
Int. Cl. A21c *11/20*
U.S. Cl. 107—1 9 Claims



An apparatus for molding bread dough or other viscous material as an outer layer or crust about a core of another material, such as jam or cream, has a hollow assembly defining an inner passage with a discharge opening at one end through which the core material issues, and a housing extending around the hollow assembly and spaced radially from the latter to define an outer passage in which the crust material is propelled by a rotary conveyor screw to issue through an annular outlet defined between the hollow assembly and a ring member which is rotated independently of the conveyor screw, and preferably at a lower speed than the latter. Further, it is preferred that the conveyor screw consist of a helical rib member having the spaces between its turns closed at their radially inner sides by the outer surface of the hollow assembly and as to which the helical rib member is rotatable.

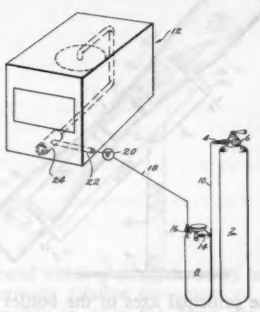
3,615,148

WATER SYSTEM FOR STEAM RANGES

Sydney Simon, Pittsburgh, Pa., assignor to Sydney Simon and Morris Simon, Pittsburgh, Pa.

Filed Feb. 4, 1969, Ser. No. 796,374
Int. Cl. A21b *1/08*
U.S. Cl. 126—20 12 Claims

A portable adaptable water feeding system for steam ranges comprising an apparatus utilizing pressurized gas to retard or prevent the growth of bacteria and as a pump



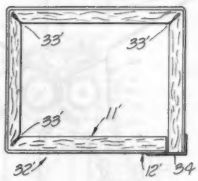
to drive fluid from a tank into the steam generating chamber of a food steamer or cooking appliance.

3,615,149

HEAT INSULATING PRODUCT

Joseph G. Malone, 576 Winston Ave., San Marino, Calif. 91108, and H. Morton Smith, 2373 Oak Ranch Road, La Habra, Calif. 90631

Filed Sept. 20, 1968, Ser. No. 761,156
Int. Cl. F16l *59/14*
U.S. Cl. 138—151 13 Claims



A heat insulating product formed from a blanket of fiber glass by itself or laminated to foil or other flexible sheet material wherein the shape and density of one or more portions of the blanket have been permanently modified for a useful purpose as for example to fit about obstructions or to facilitate hinging of the blanket along a desired axis. The hinge has a pronounced memory and tendency to return to the normal state thereof as first made and can be flexed repeatedly without harmful effects. The material lends itself admirably to lining multisided chambers with a single plaque of either the laminated or nonlaminated material. The material is processed quickly and economically by the application of heat and pressure to selected areas and, if desired, such areas may be coated with a protective layer beneficial in strengthening and protecting such areas, or in holding adjacent portions of the blanket in different planes or positions.

3,615,150

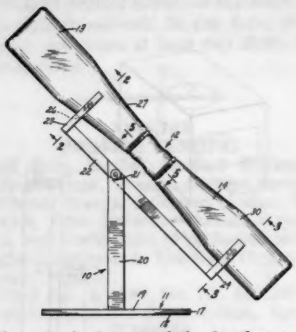
MEANS FOR DRAINING CATSUP BOTTLES

William G. Indrunas, 251 E. 32nd St., New York, N.Y. 10016

Filed Oct. 31, 1969, Ser. No. 872,846
Int. Cl. B65b *1/06, 3/06;* B67c *3/00*
U.S. Cl. 141—375 2 Claims

A device for supporting a pair of bottles for the drainage of a thixotropic fluid from one bottle to another,

including means for interconnecting said bottles at the mouths thereof, and supporting said bottles for drainage



such that the principal axes of the bottles are aligned at an acute angle with respect to the horizontal.

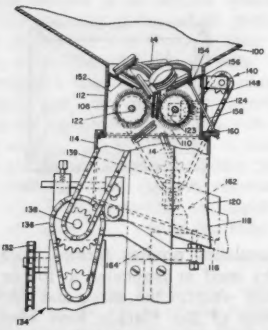
ERRATUM

For Class 181—.5 see:
Patent No. 3,615,162

3,615,151
CLOSURE HANDLING APPARATUS

Walter S. Sterling, Quincy, Mass., assignor to Pneumatic Scale Corporation, Quincy, Mass.

Original application Mar. 27, 1967, Ser. No. 626,040. Divided and this application July 25, 1968, Ser. No. 747,651
Int. Cl. B65g *47/24*
U.S. Cl. 198—33 1 Claim



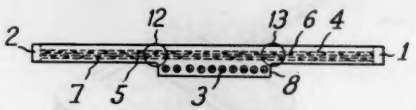
Randomly arranged shallow closures are guided between opposed rotary brushes. Closures enter between the brushes with the open end of a closure facing either one or the other of the opposed brushes. As a closure passes between the brushes, the bristles of one brush enter the open end of the closure, the opposing brush bearing against the closed end. The engagement of the bristles with the open end of a closure causes the closure to move to a position with its open end facing upwardly when released by the brushes.

3,615,152
CONVEYOR BELTS

Jacques Bouzat, Roland Joug, and Bernard Ragout, Clermont-Ferrand, France, assignors to Pneumatiques Caoutchouc Manufacture et Plastiques Kleber-Colombes, Colombes, France

Filed July 7, 1969, Ser. No. 839,503
Claims priority, application France, July 8, 1968, 158,387
Int. Cl. B65g *15/36, 15/40*
U.S. Cl. 198—193 1 Claim

This invention relates to reinforced conveyor belts having a longitudinal reinforcing layer and a number of transverse reinforcing layers constituted by parallel elements that are inclined with respect to the median plane of the belt. These transverse layers are arranged symmetrically in relation to the median plane so that their ele-



ments cross each other forming, with said plane, angles of equal and opposite direction. The width of the longitudinal reinforcing layer is smaller than the width of any one of the transverse reinforcing layers being between ¼ and ⅔ of such width.

3,615,153
ADJUSTABLY SUPPORTED PLATFORM

Eunice E. Cagle, Rte. 4, Hanceville, Ala. 35077

Filed Apr. 22, 1970, Ser. No. 30,652
Int. Cl. A47f *5/08*
U.S. Cl. 211—113 9 Claims

A platform is mounted on a substantially vertical supporting rod. The vertical rod is mounted for movement by the operator to various positions within the work area. The platform extends perpendicularly from the vertical rod and is journalled for rotation in a horizontal plane. The journal between the platform and the rod is formed by a sleeve and indexing teeth are provided in a concentric ring at the base of the sleeve, which engages a matingly indexed cap on the rod. A vertical component of the weight of the platform holds the indexed portions in engagement. To rotate the platform the indexed portions must first be disengaged by lifting the sleeve so that the sleeve slides upwardly along the rod. Various embodiments encompass different supports for the vertical rod and include a pendant support from an overhead track, as well as a floor support including a caster and a generally horizontal guide rail. Another embodiment includes a rim journalled for rotation about the cylindrical base of a chair and an indexing detent to prevent rotation of the rim after the desired position of the vertical supporting rod has been obtained.

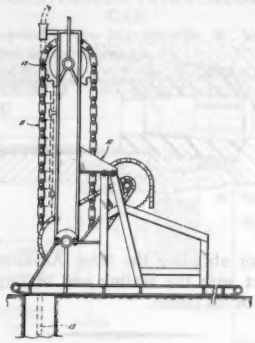
3,615,154
GRIPPER

Dale H. Pryor, Houston, Tex., assignor to Youngstown Sheet and Tube Company, Youngstown, Ohio

Filed Sept. 19, 1969, Ser. No. 859,489
Int. Cl. B65h *17/34*
U.S. Cl. 226—173 5 Claims

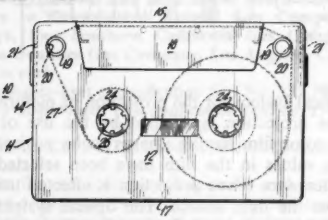
A retractor having an endless train made up of a plurality of grippers. The grippers have contoured gripping faces which are contoured to grip pipe of different sizes and the degree of movement of the grippers toward and away from pipe engaging positions is selectively controlled relatively to the size of pipe being

gripped. The grippers are mounted on pivot pins at positions to either side of the center line of the piston



supplying the gripping force to increase the resultant gripping force exerted by the grippers.

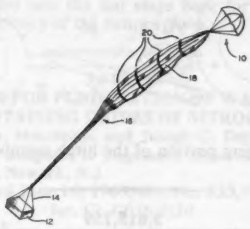
3,615,155
RECORDING TAPE CARTRIDGE
Emery Gelbman, 90 Squirrel Lane, Levittown, N.Y. 11756
Filed Mar. 26, 1969, Ser. No. 810,745
Int. Cl. G11b *15/08, 23/06, 23/10*
U.S. Cl. 242—188 **9 Claims**



A magnetic type cartridge includes a casing which houses an endless tape having a storage section wound on a spool or a double ended tape extending between a pair of spools, the tape having one or more transparent control sections and advancing about a tubular guide post. The post has a side opening aligned with a casing end opening, an open end registering with an opening in the casing top wall, and a reflector or prism surface inclined to direct light from one opening to the other. A lamp registers with each end opening and a photoconductor registers with each top wall opening. Networks are provided which are responsive to the photoconductor to control the tape drive.

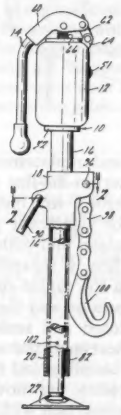
3,615,156
REEFING LINE CUTTER
Gerald M. Blain and William H. Colburn, Jr., San Jose, Calif., assignors to Space Ordnance Systems Inc., Saugus, Calif.
Filed June 6, 1969, Ser. No. 830,954
Int. Cl. B64d *17/58*
U.S. Cl. 244—150 **6 Claims**

An explosively actuated cutter assembly for severing the reefing lines which hold together the canopy of a parachute as the latter is deployed. The explosive which drives the cutter blade through the reefing line is detonated by utilizing the tension developed in the reefing line by the tendency of the parachute to unfurl to drive a firing pin against a primer. The explosive train within each cutter assembly may be identical; that is, there is no necessity for different delay times to provide sequential severing of the reefing lines to that nearest the parachute canopy apex from the load since the reefing lines are automatically tensioned in that order as the parachute is unfurled. An inexpensive bracket is provided in combination with the movable cutter assembly to hold the reefing line with an



initial kink or bend which is straightened by tension in the line, thereby causing relative movement of the bracket and cutter assembly to drive the firing pin against the primer and initiate the explosive train.

3,615,157
HYDRAULIC JACK
Luigi D'Amico Trotta, Caracas, Venezuela, assignor to Multiprens, C.A., Caracas, Venezuela
Filed Jan. 23, 1969, Ser. No. 793,277
Claims priority, application Venezuela, Mar. 7, 1968, 365
Int. Cl. B66f *3/24*
U.S. Cl. 254—93 H **3 Claims**

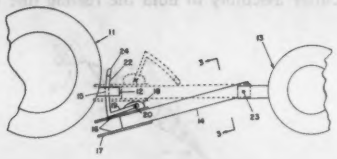


There is herein disclosed a hydraulic jack for use with automobiles or the like, having a pump handle connected to a piston for pumping hydraulic fluid from a reservoir to a lifting cylinder. The lifting cylinder surrounds a stationary, ground supported piston and carries a hook for connection to an automobile bumper or the like.

3,615,158
TRACTOR-WAGON HITCH GUIDE
Harland H. Sternhagen, Box 184, Rte. 2, Westfield, Wis. 53964
Filed July 30, 1969, Ser. No. 845,963
Int. Cl. B60d *1/00*
U.S. Cl. 280—477 **1 Claim**

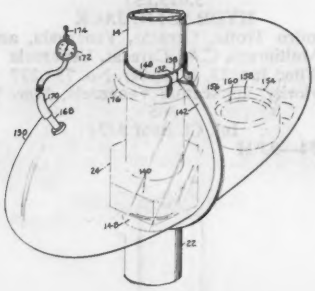
A tractor-wagon hitch guide that allows a single operator to accurately align the tractor towbar and wagon tongue to facilitate connecting. The guide includes a connecting member pivotally mounted on the tongue or draw bar of the wagon or other implement to be towed and an arcuate bar or rod connected to and extending upwardly from the member mounted on the tongue or

draw bar, the arc of said rod having a radius equal to the distance between the pivot point of said wagon tongue



and the engaging portion of the hitch member attached on said tongue.

3,615,159
METHOD AND APPARATUS FOR CHANGING GAS FITTINGS, METERS AND THE LIKE
Charles E. Muñoz, P.O. Box 17758, El Paso, Tex. 79917
Filed Nov. 12, 1968, Ser. No. 775,053
Int. Cl. F16l *55/00*
U.S. Cl. 285—18 **11 Claims**



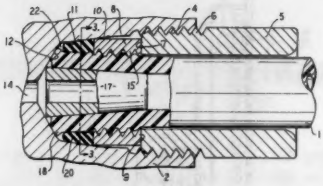
To allow removal and replacement of any domestic-type gas meter, or other on-the-line components, without access to premises beyond the meter and without the slightest interruption or significant pressure drop in the gas supply to the premises, and without requiring special fittings in the supply line, a separable or flexible casing is designed to fit about the region of connection between the meter's outlet connection and the house or service gas line. The casing is closed and sealed about this region and purged of air, whereupon the service line is disconnected at its standard coupling and the meter, and a relatively portion of the casing, are moved to bring an auxiliary gas supply into connection with the service line. The casing can then be opened, and the meter, or other component, totally disconnected, and/or replaced, without affecting the gas supply to the premises.

3,615,160
TUBE AND SEALED JOINT ASSEMBLY
Harry A. Feather, Sarasota, Fla., assignor to Hynautic, Inc., Nokomis, Fla.
Filed Nov. 3, 1969, Ser. No. 873,355
Int. Cl. F16l *33/00*
U.S. Cl. 285—250 **9 Claims**

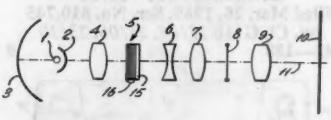
A body of a hydraulic device has a tube receiving bore with annular wedging, sealing, and seating surfaces, respectively. A deformable plastic tube is embraced by a rigid lock collar and carries a deformable annular seal.

A rigid expanding and reinforcing tapered sleeve is arranged in the tube with a portion protruding from the tube end.

Upon initial insertion of the tube into the bore, the seating area pushes the sleeve farther into the tube and interlocks the tube with the collar, and then the collar engages the wedging surface which fricitonally constrains the collar from rotation. The sleeve progressively expands the tube into tighter sealing relation with the collar without twisting or abrading the tube. An annular seal is in sealed contact with the sealing and seating surfaces and the inner end of the collar.

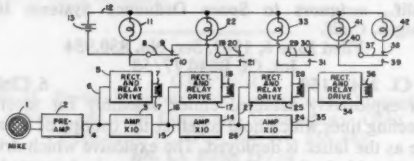


3,615,161
XENON ARC PICTURE PROJECTION
Herbert E. Bragg, Oxford, N.J., assignor to CinemaScope Products Inc., New York, N.Y.
Filed Sept. 18, 1968, Ser. No. 760,519
Int. Cl. G02b *5/28*
U.S. Cl. 350—166 **5 Claims**



An optical system for the projection of pictures in color where the projection is effected by the use of a xenon arc with color film having images to be projected where the color values in the film have been selected for best color appearance when projection is effected using a carbon arc as the light source. The optical system contains unique transmissive or reflective filtering means for adjusting the visual effect of each of the primary colors used in the color film when projected by the Xenon arc source. It is essential to make such adjustments to obtain the best color combination in the projection of images carried by a film selected and processed to give the best color appearance when using a carbon arc for projection.

3,615,162
SOUND INTENSITY INDICATOR SYSTEM
Alfred W. Barber, Bayside, N.Y. (32—44 Francis Lewis Blvd., Flushing, N.Y. 11358)
Filed Apr. 11, 1969, Ser. No. 815,285
Int. Cl. G01h *1/08*
U.S. Cl. 181—.5 **7 Claims**



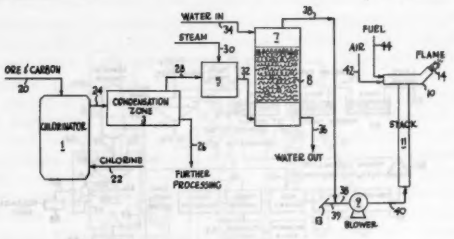
Discrete sound levels are indicated by a series of lamps. Each lamp indicates a sound intensity within a predetermined range. Lamp colors are chosen to signify intensity classifications.

3,615,163

TREATMENT OF TITANIUM TETRACHLORIDE WASTE GAS

Stanley F. Brzozowski, New Martinsville, W. Va., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 15, 1969, Ser. No. 884,827
Int. Cl. B01d *47/00*; C01g *23/02, 23/06*
U.S. Cl. 23—2 C 7 Claims



Waste gas from the chlorination of titaniferous ores is treated with steam before being vented and burned.

3,615,164

PROCESS FOR SELECTIVE REMOVAL BY METHANATION OF CARBON MONOXIDE FROM A MIXTURE OF GASES CONTAINING CARBON DIOXIDE

Bernard S. Baker, Chicago; Jack Huebler, Deerfield; Henry R. Linden, Hinsdale, and John Meek, Deerfield, all of Ill., assignors to Consolidated Natural Gas Company, Inc., Pitsburgh, Pa.; Southern California Gas Company and Southern Counties Gas Company, Los Angeles, Calif., part interest to each

Continuation-in-part of application Ser. No. 337,796, Jan., 1964, now abandoned. This application Jan. 10, 1968, Ser. No. 701,036
Int. Cl. C01b *2/16*; B01d *53/00*; C01b *1/30*
U.S. Cl. 23—2 11 Claims

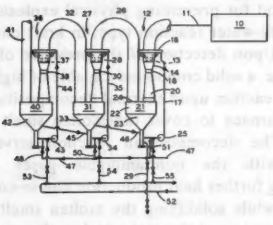
A process for recovering a substantially carbon monoxide free mixture of gases particularly useful as a low-cost fuel for acid fuel cells from a mixture of gases including hydrogen, carbon monoxide, and carbon dioxide wherein the quantity of carbon dioxide is high relative to the quantity of carbon monoxide. The carbon monoxide is selectively methanated in the presence of the high proportion of carbon dioxide by heating the gaseous mixture at about 100°–220° C. in the presence of a ruthenium or rhodium catalyst on an alumina support.

3,615,165

GASEOUS SULFUR DIOXIDE ABSORPTION SYSTEM

John L. Clement, Akron, Ohio, assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Dec. 10, 1968, Ser. No. 782,592
Int. Cl. B01d *53/34*
U.S. Cl. 23—2 R 2 Claims



A system for the absorption of SO_2 from gases of combustion where the gases are passed in series through a plurality of direct contact zones. The absorption liquid is made up of a solution of magnesium and sulfur which is sprayed into the gas, and the makeup water in the solution is selectively added into the last stage zone for optimum SO_2 absorption efficiency of the entire system.

3,615,166

CATALYSTS FOR PURIFICATION OF WASTE GASES CONTAINING OXIDES OF NITROGEN

Saul G. Hindin, Mendham, and Joseph C. Dettling, Jackson, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Newark, N.J.

Filed June 16, 1969, Ser. No. 833,775
Int. Cl. C01b *2/30*
U.S. Cl. 23—2 E 12 Claims

Improved catalysts for use in the purification of waste gases containing oxides of nitrogen comprise high surface area thoria or zirconia as a support for a catalytic deposit. The catalysts exhibit exceptionally high stability in the reaction environment.

3,615,167

PROCESS OF VANADIUM RECOVERY FROM AN ORGANIC MEDIUM

Jean Berthoux, Decines, and Jean Philippe, Caluire, both of France, assignors to Progill, Paris, France

Filed June 5, 1969, Ser. No. 830,858
Claims priority, application France, June 11, 1968, 50092
Int. Cl. C22b *59/00*
U.S. Cl. 23—19 V 8 Claims

Vanadium is recovered from residues of reaction masses obtained by oxidation of organic compounds in the presence of vanadium catalysts by treating with a strong mineral acid, adding a solvent for the organic products to separate off an aqueous layer containing the vanadium, bringing the pH to 5–7, adding an oxidation agent such as sodium hypochlorite and then adding an ammonium salt to precipitate ammonium metavanadate.

3,615,168

GROWTH OF CRYSTALLINE RARE EARTH IRON GARNETS AND ORTHOFERRITES BY VAPOR TRANSPORT

Friedel H. P. Wehmeier, Murray Hill, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 12, 1969, Ser. No. 849,351
Int. Cl. C22b *59/00*
U.S. Cl. 23—21 7 Claims

A process for the production of crystals of the yttrium and rare earth iron garnets and orthoferrites by vapor transport using HCl or Cl_2 has been developed. It has been found that the addition of s sufficient amount of $FeCl_3$ to the reactants suppresses the decomposition of the deposited material and allows the production of crystals of excellent quality. The process is adaptable to sealed capsule or open tube operation.

3,615,169

PROCESS FOR THE PREPARATION OF RARE EARTH FLUORIDES

Karl F. Thom, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 30, 1969, Ser. No. 872,726
Int. Cl. C22b *55/00*
U.S. Cl. 23—21 11 Claims

A method is disclosed for the preparation of anhydrous fluorides of high purity substantially free from oxyfluorides of trivalent metals of group 3*b* of the periodic system particularly of scandium, yttrium and the lanthanide rare earth metals by pyrolysis of fluoroaliphatic-sulfonates of these metals. A process for producing the latter salts which are isolated as complexes with water or organic molecules is also disclosed. These salts have unusual solubility properties.

3,615,170

PROCESS FOR SEPARATING METALS USING DOUBLE SOLVENT EXTRACTION WITH BRIDGING SOLVENT MEDIUM

Wayne C. Hazen, Wheat Ridge; Pablo Hadzeriga, Arvada, and Paul R. Kruesi, Golden, all of Colo., assignors to Molybdenum Corporation of America, New York, N.Y.

Filed Dec. 3, 1969, Ser. No. 881,654
Int. Cl. C22b *59/00*
U.S. Cl. 23—22 14 Claims

Solutions of metal values are fractionated by a double solvent liquid-liquid extraction process wherein the solution is contacted with one extractant to selectively remove at least one metal value, then the solution is contacted with a second extractant to selectively remove another metal value, and the solution depleted of both metal values is recycled in a bridge between the two extractants. The process permits separation in aqueous and nonaqueous media; and it improves separation efficiency by allowing equilibration of metal values between the unmixed extractants and by permitting countercurrent flows. The process is especially useful to fractionate rare earth metal values and yttrium.

3,615,171

PROCESS OF SEPARATING YTTRIUM FROM LANTHANIDE RARE EARTHS

George W. Mason, Clarendon Hills; Sonia Lewey; Allen F. Bollmeier, Joliet, and Donald F. Peppard, Oak Park, all of Ill.

Filed June 15, 1970, Ser. No. 46,191
Int. Cl. C01b *59/00*
U.S. Cl. 23—22 10 Claims

Yttrium values are separated from lanthanide rare earth values which are present together as bromides in an aqueous feed solution containing excess bromide ions by extracting the lanthanide rare earth values and some of the yttrium values from the feed solution with bis-2-ethyl hexyl chloromethyl phosphonate, scrubbing the yttrium values from the extractant with an aqueous scrub solution of hydrogen bromide and lithium bromide, and separating the yttrium values from the aqueous feed and scrub solutions.

3,615,172

PREPARATION OF CRYSTALLINE CARBONATOZIRCONATES OF AMMONIUM AND POTASSIUM

Franklin Charles Fulson, Lewiston, N.Y., assignor to NL Industries, Inc., New York, N.Y.

Filed Feb. 12, 1969, Ser. No. 798,804
Int. Cl. C22b *59/00*; C01g *25/00*
U.S. Cl. 23—22 7 Claims

Ammonium or potassium carbonatozirconate is prepared as a crystalline, water-soluble product by the reaction, in a liquid medium consisting essentially of a lower aliphatic alcohol and a minor amount of water, of a water-soluble zirconium chloride and the carbonate or bicarbonate of the alkali.

3,615,173

SEPARATION OF RARE EARTH ELEMENTS BY ION EXCHANGE

J. Oscar Winget, Sparks, and Roald E. Lindstrom, Reno, both of Nev.

Filed Apr. 3, 1969, Ser. No. 813,048
Int. Cl. C22b *59/00*
U.S. Cl. 23—23 2 Claims

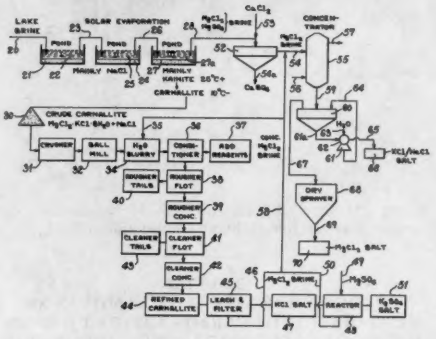
Diethylenetriaminepentaacetic acid or hydroxyethylethylenediaminetriacetic acid is used as retaining agent in separating rare-earth elements on a cation-exchange resin column. The rare-earth metals and their compounds find a wide variety of uses such as use in special alloys, in lasers, in dielectric ceramics, in nuclear technology, in phosphors, etc.

3,615,174

PROCESS FOR THE SELECTIVE RECOVERY OF POTASSIUM AND MAGNESIUM VALUES FROM AQUEOUS SALT SOLUTIONS CONTAINING THE SAME

William J. Lewis, South Ogden, Utah, assignor to NL Industries, Inc., New York, N.Y.

Filed June 28, 1968, Ser. No. 740,886
Int. Cl. B03b *1/00*; B03d *1/02*; C01f *5/26*
U.S. Cl. 23—38 11 Claims



Kainite immersed in brine in equilibrium converted to carnallite by cooling to about 10° C. or under. Carnallite so obtained purified by cold flotation. Purified carnallite water leached to yield magnesium chloride brine and potassium chloride salt. Latter optionally converted to potassium sulfate by reaction with kainite, or by reacting the carnallite with kainite. Naturally occurring brine concentrated to precipitate principally sodium chloride, mother liquor warm concentrated to precipitate kainite, cooled under mother liquor for conversion to carnallite. A crude kainite fraction purified by warm flotation and a crude carnallite fraction purified by cold flotation reacted together to yield magnesium chloride brine and potassium sulfate salt.

3,615,175

PREVENTING PHYSICAL EXPLOSION DUE TO THE INTERACTION OF LIQUID WATER AND MOLTEN CHEMICAL COMPOUNDS

Hugh Wharton Nelson, West Hartford, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Mar. 24, 1969, Ser. No. 809,988
Int. Cl. C01d *11/00*; D01n *33/00*; D21c *11/12*
U.S. Cl. 23—48 3 Claims

A method for preventing physical explosions, particularly of the smelt-water reaction type, in kraft chemical recovery furnaces. Upon detection of the presence of liquid water in the furnace, a solid compound capable of highly endothermic chemical reaction upon thermal decomposition is introduced into the furnace to cover the molten smelt on the furnace bottom. The decomposition reaction serves to inert the furnace with the nonflammable gases produced thus eliminating further heat production due to combustion in the char bed while solidifying the molten smelt (i.e., removing sensible heat stored therein) which is the source of explosive energy. The materials which may be employed for this purpose are alkali and alkaline earth carbonates and bicarbonates including sodium bicarbonate, ammonium carbonate and ammonium bicarbonate.

3,615,176

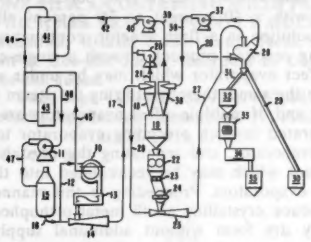
SODIUM CYANIDE PROCESS AND BRIQUETS FORMED THEREFROM

William Riley Jenks, and Olyn Wayne Shannon, both of Memphis, Tenn., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of application Ser. No. 734,767, June 5, 1968, now abandoned. This application Apr. 28, 1969, Ser. No. 824,354

Int. Cl. C01c *3/10*; B29j *1/00*

U.S. Cl. 23—84 13 Claims



Predensifying anhydrous sodium cyanide crystals and then compacting the resulting classified granules produces anhydrous sodium cyanide in briquet form that possesses unique characteristics. The briquets are essentially nonporous in structure with unit density approaching true crystal density and possess uniform internal hardness, remarkable durability and a high rate of solution. Using closed circuit hot air for conveying and drying, reduces sodium carbonate and formate content and the sodium cyanide is high in chemical purity.

3,615,177

PRODUCTION OF AQUEOUS AMMONIUM THIOCYANATE SOLUTIONS AND THIOCYANATE COMPOUNDS

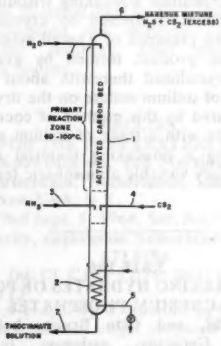
Helmut Magerlein, Erlenbach; Gerhard Meyer, Obernburg, and Hans-Dieter Rupp, Erlenbach, all of Germany, assignors to Glanzstoff AG, Wuppertal, Germany

Filed Oct. 21, 1968, Ser. No. 769,148

Claims priority, application Germany, Oct. 21, 1967, P 15 42 339.4

Int. Cl. C01c *3/00*; C01b *11/16*, *31/08*

U.S. Cl. 23—75 21 Claims



Ammonia and carbon disulfide are reacted at about 60–100° C. on an activated carbon, preferably in a continuous manner permitting high yields of a relatively pure ammonium thiocyanate or the corresponding alkali metal and alkaline earth metal thiocyanates.

3,615,178

PROCESS FOR THE PURIFICATION OF TITANIUM TETRACHLORIDE FROM TRACES OF CARBON COMPOUNDS

Fabrizio Guicciardi, and Paolo Palagi, both of Novara, Italy, assignors to Montecatini Edison S.p.A., Milan, Italy

Filed Apr. 30, 1969, Ser. No. 820,663

Claims priority, application Italy, May 3, 1968, 16.033A/68

Int. Cl. C01g *23/02*

U.S. Cl. 23—87 TP 3 Claims

This application discloses a process for purifying titanium tetrachloride from the carbon residues resulting from the purification of $TiCl_4$ by means of organic compounds, the raw titanium tetrachloride being treated with aluminum trichloride at temperatures ranging between 100° C. and boiling temperature, and in the presence of from 0.01 to 1 percent (by weight of the $TiCl_4$) of finely divided TiO_2 having a particle size ranging between 0.05 and 10 microns.

3,615,179

PREPARATION OF MAGNESIUM PERCHLORATE

David S. Rosenberg, Niagara Falls; Alfred O. Minklei, Grand Island, and Walter M. Zimberg, Tonawanda, all of N.Y., assignors to Hooker Chemical Corporation, Niagara Falls, N.Y.

Filed Nov. 10, 1969, Ser. No. 875,552

Int. Cl. C01b *7/00*

U.S. Cl. 23—85 10 Claims

Magnesium perchlorate of very high purity is prepared by the reaction of magnesium metal with water in the presence of an activating amount of perchloric acid to form $MgO(H_2O)_x$ in aqueous suspension. Concentrated perchloric acid is gradually added to the suspension of $MgO(H_2O)_x$ while vigorously agitating the mixture to produce magnesium perchlorate. The product is useful as an electrolyte in storage batteries.

3,615,180

METHOD OF IMPROVING THE QUALITY OF SYNTHETIC CRYOLITE

Makoto Kadotani, Ube-shi, and Seishiro Isobe, Yamaguchi-shi, both of Japan, assignors to Central Glass Co. Ltd., Yamaguchi-ken, Japan

Filed Jan. 5, 1970, Ser. No. 793

Int. Cl. C01f *7/54*

U.S. Cl. 23—88 5 Claims

A method of producing synthetic cryolite having a reduced ignition loss, which comprises repulping synthetic cryolite in an aqueous solution of below pH 4 of an acid selected from the group consisting of hydrochloric acid, nitric acid and sulfuric acid, for at least 10 minutes at a temperature below the boiling point of said aqueous solution, and thereafter recovering the purified synthetic cryolite.

3,615,181

PROCESS FOR PRODUCING SOLUTIONS OF MAGNESIUM VALUES

William C. Bauman, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

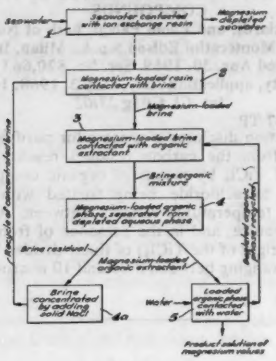
Filed Aug. 22, 1969, Ser. No. 852,339

Int. Cl. C01f *5/30*, *5/26*

U.S. Cl. 23—91 15 Claims

Disclosed herein is a process for providing relatively pure and concentrated aqueous solutions of magnesium values, e.g. $MgCl_2$. The process comprises contacting sea water or similar dilute and impure solutions of magnesium values, with a cation-type ion exchange resin. Aqueous brine is subsequently exchanged with the resin to provide an aqueous brine solution of magnesium values. This solution is contacted with a water-immiscible organic phase comprising an organic acid and an amine. Magnesium values are thereby

extracted into the organic phase. Subsequently the organic extractant phase is contacted with an aqueous stripping


Seawater
Seawater contacted with ion exchange resin
Magnesium depleted seawater
Magnesium-loaded resin contacted with brine
Magnesium-loaded brine
Magnesium-loaded brine contacted with organic extractant
Brine organic mixture
Magnesium-loaded organic phase, separated from depleted aqueous phase
Brine residual
Magnesium-loaded organic extractant
Brine concentrated by adding solid NaCl
Water
Loaded organic phase contacted with water
Product solution of magnesium values
Recycle of concentrated brine
Depleted organic phase recycled

medium, e.g. water, to provide a relatively pure solution containing up to about 20 weight percent magnesium values.

3,615,182

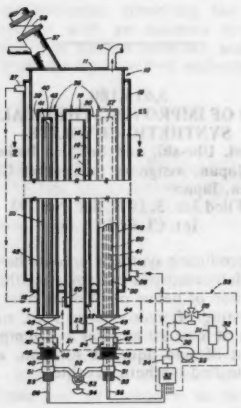
PROCESS FOR GENERATING METAL HALIDES

Oliver W. Moles, Edmond, Okla., and Bryce H. McMullen, New Shrewsbury, N.J., assignors to NL Industries, Inc., New York, N.Y.

Division of Ser. No. 586,709, Oct. 14, 1966, Pat. No. 3,492,097. Filed Nov. 14, 1969, Ser. No. 871,318 application Nov. 14, 1969, Ser. No. 871,318

Int. Cl. C01f *7/56, 7/58*

U.S. Cl. 23—93 **2 Claims**



The present invention relates in general to the production of a metal halide and more especially to an improved process and apparatus for producing vaporous aluminum chloride.

3,615,183

REMOVAL OF CHROMIUM FROM ALUMINUM NITRATE

Wilbur Don Wise, Benton, Ark., assignor to Reynolds Metals Company, Richmond, Va.

Filed Feb. 5, 1970, Ser. No. 9,037

Int. Cl. C01f *7/24, 7/66*

U.S. Cl. 23—102 R **5 Claims**

Aluminum nitrate solutions contaminated with dissolved chromium, and particularly those obtained in the extraction of clay or bauxite with nitric acid, are substantially freed from chromium by treatment with an alkali persulfate in the presence of hematitic iron oxide solids.

3,615,184

PROCESS OF PRODUCING ALKALI METAL ORTHOPHOSPHATES

Oskar Gehrig, and Theodor Riehm, both of Mannheim, Germany, assignors to Joh. A. Benckiser GmbH, Chemische Fabrik, Ludwigshafen, Germany

Filed Dec. 29, 1967, Ser. No. 694,700

Claims priority, application Germany, Dec. 30, 1966, B 90523

Int. Cl. C01b *25/30*

U.S. Cl. 23—107 **8 Claims**

Alkali metal salts of orthophosphoric acid are obtained by continuously reacting the required amounts of concentrated phosphoric acid with 40 percent to 65 percent of phosphorus pentoxide, with a 40 percent to 70 percent alkali metal hydroxide solution in a flash reactor, continuously passing the resulting reaction product through a single-effect or a multiple-effect evaporator which may be under vacuum to concentrate the same, thereby utilizing the steam set free in the reactor and, if multiple-effect evaporators are used, the steam generated in each preceding evaporator to heat the following evaporator, and separating the crystals from the mother liquor which may be recirculated into the reactor and/or the evaporators. Proceeding in this manner permits one to produce crystalline alkali metal orthophosphates in substantially dry form without additional supply of heat energy.

The apparatus assembly for carrying out this improved process consists of a flash reactor with stirring device, a single-effect evaporator or a multiple-effect evaporator connected in series with the reactor, a device for separating crystals from liquid such as a centrifuge, and a vacuum device. Pipes connecting the evaporators with, and conducting the condensed steam therefrom to, heat exchangers for preheating the reaction components may be provided, likewise pipes connecting the liquid discharge of the separating device with the reactor and/or the evaporators.

Examples of alkali metal orthophosphates obtained by the process and apparatus of this invention are monosodium and monopotassium orthophosphates, disodium orthophosphates with and without water of crystallization, trisodium orthophosphate.

3,615,185

PROCESS FOR THE PRODUCTION OF TRISODIUM PHOSPHATE

Joel B. Jacobs, Lakewood, and Steve Taborosi, Woodbridge, both of N.J., assignors to FMC Corporation, New York, N.Y.

Filed Nov. 22, 1968, Ser. No. 778,303

Int. Cl. C01b *25/28*

U.S. Cl. 23—107 **4 Claims**

A free-flowing crystalline noncaking trisodium phosphate dodecahydrate product is formed by crystallization from water solution in the presence of a small amount of sodium sulfate so that the product formed by evaporation will actually have cocrystallized therewith about 0.25 to 0.80 percent by weight of sodium sulfate on the dry crystal basis. The product prepared by this method of cocrystallizing the trisodium phosphate with a trace of sodium sulfate has the advantage of being a noncaking material under storage conditions of ordinary variable atmospheric temperature and humidity.

3,615,186

PROCESS OF MAKING HYDRATES OF POTASSIUM-MAGNESIUM PHOSPHATES

Wilhelm Jahn-Held, and Otto Braun, both of Kassel-Wilhelmshohe, Germany, assignors to Wintershall Aktiengesellschaft, Kassel, Germany

Filed Dec. 9, 1969, Ser. No. 883,556

Int. Cl. C01b *25/26, 25/30, 25/32*

U.S. Cl. 23—107 **14 Claims**

Hydrates of potassium-magnesium phosphates are made by (a) reacting phosphoric acid with an aqueous solution of an aliphatic water-soluble amine wherein the amine is present in

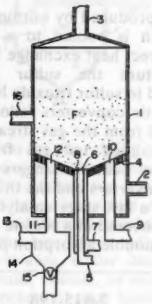
an excess sufficient to cause only about one half of the amount of the amine to be used up in the reaction; (b) then dissolving in the solution K_2SO_4 in an amount per equivalent of P_2O_5 equal to the stoichiometric amount or up to 5 percent in excess thereof; (c) then pouring an aqueous solution of $MgSO_4$ into the mixture while stirring, the amount of $MgSO_4$ being about 2 equivalents per equivalent of P_2O_5 and causing precipitation at a pH between about 11.0 and 14.0 and (d) separating the precipitated $KMgPO_4$ hydrate.

3,615,187

PROCESS FOR THE PRODUCTION OF SPHERICAL ALUMINA-SILICA-CONTAINING SOLID PARTICLES WHICH ARE PREDOMINANTLY MULLITE

Yuichi Suzukawa; Hisashi Kono; Kenji Terai, and Muneki Saito, all of Ube-shi, Japan, assignors to Ube Industries, Ltd., Ube-shi, Japan

Filed Sept. 12, 1969, Ser. No. 857,449
Claims priority, application Japan, Sept. 17, 1968, 43/66627
Int. Cl. C01b *33/26*
U.S. Cl. 23—110 R 7 Claims



A process for producing spherical alumina-silica-containing solid particles which comprises introducing a powdered raw material (A) containing alumina and silica as well as a compound selected from the group consisting of magnesia and magnesium compounds capable of forming magnesia under burning conditions to a fluidized bed with the forced circulation flow of the solid particles, in the presence of a solid seed material (B) having a particle diameter one-tenth to two-thirds that of the product particles and consisting essentially of silica, alumina and magnesia; burning said powdered raw material (A) and said seed material (B) in said fluidized bed to coat said seed material (B) with said powdered raw material (A); and thereafter recovering the resulting solid particles which are predominantly mullite.

3,615,188

PROCESS FOR THE PREPARATION OF MORDENITE

Herman W. Kouwenhoven, and Martinus J. L. Van Beem, both of Amsterdam, Netherlands, assignors to Shell Oil Company, New York, N.Y.

Filed Sept. 5, 1968, Ser. No. 757,767
Claims priority, application Netherlands, Sept. 29, 1967, 6713254
Int. Cl. C10b *33/28*; B01j *11/40*
U.S. Cl. 23—113 8 Claims

A method of preparing mordenite by hydrothermal treatment of a silica-alumina cogel prepared by precipitation of alumina on a silica gel (as opposed to a coprecipitate) in which the cogel is heated in an alkali solution having excess alkali (calculated basis the alkali-metal oxide), the total amount of alkali being equal to $Ax/102+by/1000$, where A is the molecular weight of the alkali oxide, x is the weight of alumina in the cogel, in grams; y is the weight of water in the total solution, in grams; and b is the weight, in milligrams, of excess alkali (basis a molar alkali-alumina ratio of 1 per gram of water and is in a range between 7–30 milligrams per gram of water.

3,615,189

PROCESS FOR PREPARING GYPSUM HEMIHYDRATE

Masashi Hayakawa, Tokyo; Kazunari Ueno, Tokyo, and Yoshito Yasutake, Ube-shi, all of Japan, assignors to Central Glass Co., Ltd., Ube-shi, Japan

Continuation of application Ser. No. 622,452, Mar. 13, 1967, now abandoned. This application June 9, 1969, Ser. No. 831,743
Int. Cl. C01f *11/46*
U.S. Cl. 23—122 3 Claims

Stable calcium sulfate hemihydrate is produced by suspending particulate gypsum in a reaction mixture comprising a water solution of a water-soluble inorganic salt such as a salt of an alkali metal, an alkaline earth metal or ammonium, and at least one of the group consisting of phosphoric acid and water-soluble phosphate salts; and heating the reaction mixture at a temperature and for a period of time sufficient to convert the particulate gypsum to particulate calcium sulfate hemihydrate containing a small quantity of phosphoric acid in solid solution, and separating the particulate calcium sulfate hemihydrate from the reaction mixture.

3,615,190

OXIDATION OF LEAD BLAST FURNANCE MATTE

John D. Corrick, Olney, and Joseph A. Sutton, Rockville, both of Md., assignors to The United States of America as represented by the Secretary of the Interior

Filed Jan. 29, 1969, Ser. No. 794,979
Int. Cl. C22b *13/04*; C01g *21/20*
U.S. Cl. 23—125 2 Claims

A process for oxidizing lead blast furnace matte comprising treating the matte with oxygen in an acidic aqueous solution having a pH not in excess of about 1.5 and a temperature not in excess of about 50° C. This results in oxidation of metallic sulfides, e.g., lead, copper and iron sulfides, in the matte to sulfates which can then be separated by conventional leaching methods. The process thus enables recovery of both lead and copper from the matte.

3,615,191

METHOD OF PREPARING LITHIUM SULFIDE

Ricardo O. Bach, and Arthur S. Gillespie, Jr., both of, Gastonia, N.C., assignors to Lithium Corporation of America, New York, N.Y.

Filed Aug. 27, 1969, Ser. No. 853,516
Int. Cl. C01b *17/22*
U.S. Cl. 23—134 10 Claims

A method of preparing lithium sulfide which comprises forming a reaction mixture of lithium metal and an anhydrous, organic solvent, especially an ether such as tetrahydrofuran capable of dissolving small amounts of lithium metal, heating the reaction mixture to reflux temperature, and introducing hydrogen sulfide into the mixture to form lithium sulfide.

3,615,192

OXIDATION OF HYDROGEN CYANIDE TO CYANOGEN IN A LIQUID MEDIUM UTILIZING A COPPER CATALYST

Kenneth L. Olivier, Placentia, Calif., assignor to Union Oil Company of Calif., Los Angeles, Calif.

Filed Aug. 1, 1969, Ser. No. 846,922
Int. Cl. C01c *3/00*
U.S. Cl. 23—151 5 Claims

Hydrogen cyanide is oxidized to cyanogen by contacting hydrogen cyanide and oxygen with a substantially anhydrous liquid medium comprising a minor amount of copper at a temperature between 0° C. and about 150° C. and a pressure sufficient to maintain liquid phase conditions.

3,615,193
PRODUCTION OF PHOSPHORIC ACID

Theodore B. Simpson, 910 Wardman Drive, Brea, Calif.

Substitute for application Ser. No. 492,921, Oct. 4, 1965, now abandoned. This application Aug. 20, 1969, Ser. No. 851,742
Int. Cl. C01b *25/18, 25/16*
U.S. Cl. 23—165 **5 Claims**

In the evaporation of concentrated wet process phosphoric acid it is difficult to produce a concentrated acid having a low viscosity. If residence or retention times of 15 seconds to 1 minute are correlated with the evaporation temperature employed such low-viscosity phosphoric acids are obtained.

3,615,194
PROCESS FOR THE PREPARATION OF AN ANHYDRIDE OF TRIVALENT PHOSPHORUS

Allan K. Reed, Columbus; William M. Goldberger, Bexley, and David D. Whyte, Wyoming, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sept. 24, 1969, Ser. No. 860,776
Int. Cl. C01b *25/12, 25/16*
U.S. Cl. 23—165 **16 Claims**

A process for the preparation of an anhydride of trivalent phosphorus wherein an anhydride of pentavalent phosphorus is reduced by carbon monoxide in a DC plasma flame is disclosed. The anhydride of trivalent phosphorus is useful as an intermediate in the preparation of detergency builders for use in detergent compositions.

3,615,195
FLUOSILIC ACID RECOVERY

Lawrence W. Bierman, Jr., and Jerry L. May, both of Pocatello, Idaho, assignors to J. R. Simplot Company, Boise, Idaho

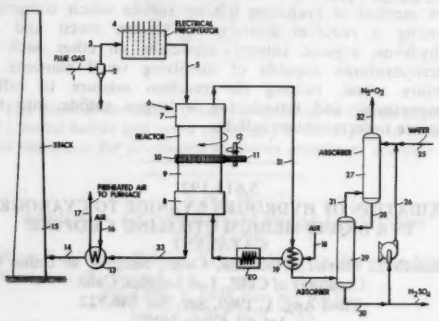
Filed Dec. 11, 1968, Ser. No. 812,497
Int. Cl. C01b *25/22*
U.S. Cl. 23—165 **8 Claims**

This disclosure is concerned with a process whereby fluorine values in the form of fluosilicic acid may be effectively and economically recovered from dilute phosphoric acid wash solutions obtained in the manufacture of phosphoric acid by the wet-process.

3,615,196
PROCESS FOR THE PURIFICATION OF FLUE GAS

Albert B. Welty, Jr., Westfield; Anantha K. S. Raman, Millington, and Carl M. Lathrop, Madison, all of N.J., assignors to Esso Research and Engineering Company

Continuation-in-part of application Ser. No. 569,980, Aug. 3, 1966, now abandoned. This application May 5, 1969, Ser. No. 821,934
Int. Cl. C01b *17/78, 17/56*
U.S. Cl. 23—168 **8 Claims**

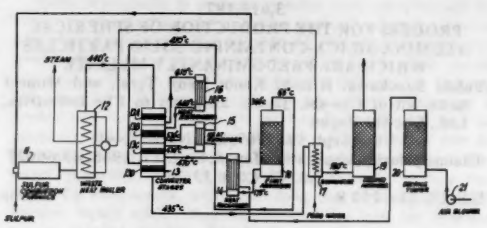


Sulfur dioxide is removed from flue gas by contacting the flue gas into contact with a vanadium pentoxide absorbent, then passing air in contact with the absorbent, causing desorption of SO_3. The reaction may be carried out in a rotating reactor containing a plurality of beds of absorbent.

3,615,197
PROCESS FOR THE PRODUCTION OF SULFUR TRIOXIDE

Walter Jaeger, Stroudsburg, Pa., assignor to Ovitron Corporation, Newburgh, N.Y.

Filed Apr. 16, 1969, Ser. No. 816,687
Int. Cl. C01b *17/68, 17/76*
U.S. Cl. 23—176 **5 Claims**

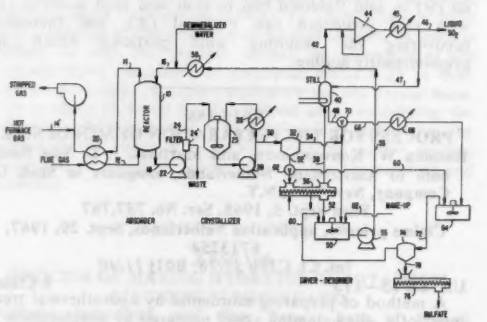


Sulfur trioxide is produced by burning elemental sulfur to sulfur dioxide which is cooled to a kindling or ignition temperature by indirect heat exchange in a waste heat boiler at which temperature the sulfur dioxide is partially catalytically oxidized to sulfur trioxide by passing it through a first group of catalytic converters following which it is then cooled and removed from the gas stream in an intermediate absorber. The remaining tail gas from the absorber is reheated by means of heat exchangers serially connected to the first group of converters and the thus-heated tail gas then finally converted in a last stage catalytic converter to sulfur trioxide which is recovered in a second absorber, this process being known as the double absorption process.

3,615,198
PROCESS EMPLOYING POTASSIUM SULFITE FOR RECOVERING SULFUR DIOXIDE FROM GASES CONTAINING SAME

Jack D. Terrana, Tampa, and Leo A. Miller, Lakeland, both of Fla., assignors to Wellman-Lord, Inc., Lakeland, Fla.

Continuation-in-part of application Ser. No. 616,682, Feb. 16, 1967, now abandoned , which is a continuation-in-part of application Ser. No. 594,431, Nov. 15, 1966, now abandoned. This application May 15, 1969, Ser. No. 847,754
Int. Cl. C01b *17/56, 17/48*
U.S. Cl. 23—178 **17 Claims**



Sulfur dioxide is recovered from waste gases by contacting the gas with aqueous potassium sulfite to produce potassium bisulfite and subsequently separating the bisulfite and SO_2-partial pressure lowering materials to obtain purer potassium bisulfite or potassium pyrosulfite which can be decomposed to release sulfur dioxide.

3,615,199

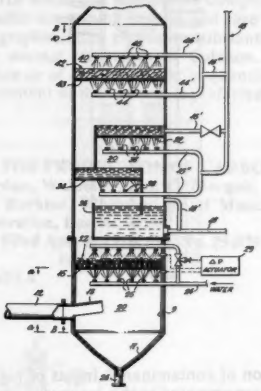
PROCESS AND APPARATUS FOR PURIFYING GAS

Jack D. Terrana, Tampa, and Leo A. Miller, Lakeland, both of Fla., assignors to Wellman-Lord, Inc., Lakeland, Fla.

Continuation-in-part of application Ser. No. 594,431, Nov. 15, 1966, now abandoned, and a continuation-in-part of 616,682, Feb. 16, 1967, now abandoned. This application Nov. 9, 1967, Ser. No. 681,661

Int. Cl. C01b 17/60, 17/48

U.S. Cl. 23—178 17 Claims



Apparatus and process for preventing plugging of a reactor used in a system involving reaction between components, e.g. SO_2, in a gas and a salt solution, e.g. a sulfite solution which is close to its saturation point, while avoiding substantial dilution of the sulfite solution to produce a spent bisulfite solution from which the bisulfite is subsequently separated and decomposed to release sulfur dioxide. Examples of sulfites include potassium, cesium, or rubidium sulfites. The apparatus includes a reaction zone having at least one, or more contact trays which are sprayed from beneath with the aqueous salt solution, e.g. sulfite solution. An entrainment zone above the trays can be used to advantage and this involves a woven mesh contact material which is sprayed from both sides with the salt solution to remove entrained materials from the gas leaving the reactor. Also, particulate solid or liquid-soluble gaseous contaminants can be removed from the gas before contacting it with the sulfite solution by contacting it with a fluid-permeable, impingement target in the presence of a concurrently flowing liquid stream which is also contacting the target. It is desirable to prevent plugging of the gas inlet opening to the reactor by using a bonnet arranged over the gas inlet opening.

3,615,200

PROCESS FOR CONCENTRATING INERT COMPONENTS IN PRESSURIZED SYNTHESIS LOOP

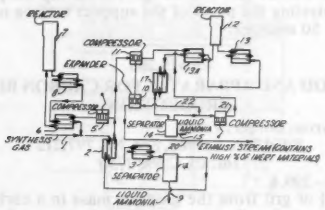
Keizo Konoki, Chiba, Japan, assignor to Toyo Engineering Corporation, Tokyo, Japan

Filed June 13, 1968, Ser. No. 736,844

Claims priority, application Japan, June 14, 1967, 42/37597

Int. Cl. C01c 1/04; B01j 9/00; C07c 29/16

U.S. Cl. 23—199 10 Claims



In a circulating pressurized synthesis system, such as an ammonia synthesis system and a methanol synthesis system, a portion of the circulating stream of the circulatory synthesis system is separated from the circulating stream, fresh reactants are, if desired, added to the portion, and then the portion is compressed at least once to a pressure higher than that of the circulatory pressurized synthesis system. The compressed portion is passed through a synthesis reactor containing catalyst at high temperature so that a further reaction is promoted. The product obtained by the further synthesis reaction is separated from the effluent of the synthesis reactor, and, if desired, the energy which is generated by expanding the balance of the effluent to a pressure lower than that of the circulatory pressurized synthesis system is utilized to supply the power necessary to initially compress the portion.

3,615,201

PROCESS FOR THE PRODUCTION OF MAGNESIUM OXIDE

Tullio Cesca, Milan; Bruno Pescarolo, Milan, and Remo Monaldi, Vercelli, all of Italy, assignors to Montecatine Edison S.p.A., Milan, Italy

Filed July 3, 1968, Ser. No. 742,157

Claims priority, application Italy, July 5, 1967, 18021/a

Int. Cl. C01f 5/20, 5/24

U.S. Cl. 23—201 7 Claims

Magnesium oxide is produced by precipitating the hydrated magnesium carbonate resulting from the reaction of a saturated solution of magnesium sulfate with solid ammonium bicarbonate in the presence of a dilute solution of ammonium sulfate; drying the crystalline fraction thus obtained; and thence calcining the same.

3,615,202

PROCESS FOR THE MANUFACTURE OF TITANIUM DIOXIDE

David R. Stern, Fullerton; Richard M. Gundzik, Hacienda Heights, Calif.; Peter M. Jones, Grimsby, and Peter J. Lynskey, Laceby, England, assignors to Kerr-McGee Corporation and Laporte Industries Limited, London, England, part interest to each

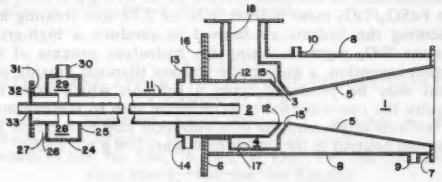
Division of Ser. No. 497,896, Oct. 19, 1965, Pat. No. 3,512,219.

Filed Nov. 28, 1969, Ser. No. 870,501

1969, Ser. No. 870,501

Int. Cl. C01g 23/04

U.S. Cl. 23—202 16 Claims



A process for the manufacture of titanium dioxide by the vapor phase oxidation of titanium tetrachloride. The titanium tetrachloride and oxidizing gas are preheated separately and the oxidizing gas is introduced through a supply conduit at an established rate of flow into a reaction zone and the titanium tetrachloride is introduced into the reaction zone with a downstream component of velocity.

3,615,203

METHOD FOR THE PREPARATION OF GROUPS III–V SINGLE CRYSTAL SEMICONDUCTORS

Kunio Kaneko, and Naozo Watanabe, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 10, 1969, Ser. No. 805,626

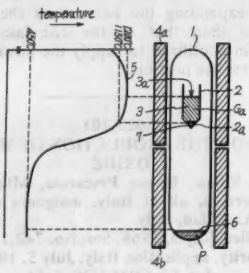
Claims priority, application Japan, Mar. 8, 1968, 43/15116

Int. Cl. C01b 27/00; B01j 17/00

U.S. Cl. 23—204 5 Claims

Method of making an intermetallic compound semiconductor composed of two elements, one of which is a group III metal which has a relatively low vapor pressure at

the melting point of the desired intermetallic compound, and the other is a Group V element which has a relatively high vapor pressure at the same temperature which involves establishing a temperature differential along a confined fused mass of the first element and exposing the higher



temperature surface of the mass to vapors of the high vapor pressure element, thereby simultaneously forming and growing at least a single crystal of the intermetallic compound at a lower temperature portion of the confined zone.

3,615,204

PREPARATION OF ANATASE TITANIUM DIOXIDE PIGMENT

John J. Libera, Affton, and Eckard J. Puetz, Lemay, both of Mo., assignors to NL Industries, Inc., New York, N.Y.

Filed Sept. 22, 1969, Ser. No. 860,015

Int. Cl. C01g *23/06, 23/08*

U.S. Cl. 23—202 R **4 Claims**

This invention relates in general to a process for preparing a high-quality titanium dioxide pigment in which the titanium dioxide is in the anatase crystal form. The process comprises hydrolyzing in a particular manner the titanium values from a titanium sulfate-ferrous sulfate solution in which the concentration of titanium is from 80 to 180 g.p.l. TiO_2 and the $FeSO_4/TiO_2$ ratio is from 2.20 to 2.75 and treating and calcining the hydrate so formed to produce a high-grade anatase TiO_2 pigment. Using the hydrolysis process of the instant invention, a high-grade anatase titanium dioxide pigment may be produced from a solution which does not require the conventional crystallization step to remove most of the iron values and the concentration step to increase the titanium content in the liquor to at least 200 g.p.l. TiO_2.

3,615,205

METHOD FOR THE SYNTHESIS AND GROWTH OF HIGH PURITY III-V SEMICONDUCTOR COMPOSITIONS IN BULK

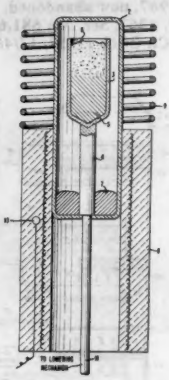
Samuel E. Blum, Bronx, and Richard J. Chicotka, Jefferson Valley, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 14, 1968, Ser. No. 767,367

Int. Cl. C01b *25/08;* **B01j** *17/00*

U.S. Cl. 23—204 **11 Claims**

Ingots of high purity III-V semiconductor compositions are prepared by encapsulating the molten Group III element with a barrier material that is permeable to the vapors of the Group V element while being impermeable to contaminants inherent in the system such as silicon and the like. The synthesis of the composition may be carried out in a conventional vertical sealed quartz enclosure. A crucible containing the Group III element and a barrier material and the Group V element are disposed within the sealed enclosure. The barrier material acts as a permeable membrane for vapors of the Group V element and as an impermeable membrane, or getter, for contaminants inherent in the system. Thus, vapors of the Group V element is permitted to diffuse through the barrier layer to react with the molten Group III element to form the III-V composition



to the exclusion of contaminants. Ingots of highly pure III-V compositions are prepared in this manner.

3,615,206

PROCESS OF PREPARING BROMINE HEPTAFLUORIDE

Charles E. Fogle, Sunnyvale, and Robert T. Rewick, Mountain View, both of Calif., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Apr. 28, 1965, Ser. No. 457,901

Int. Cl. C06b *7/24*

U.S. Cl. 23—205 **9 Claims**

1. A process for the preparation of bromine heptafluoride comprising the steps of reacting bromine pentafluoride with fluorine in the presence of a compound having the formula $MBrF_6$, wherein M is an alkali metal, at a temperature of from about 110° C. to about 340° C. and separating bromine heptafluoride from the unreacted reactants and other reaction products.

3,615,207

PRODUCTION OF HYDROGEN PEROXIDE BY ANTHRAQUINONE PROCESS

Nathan D. Lee, Lambertville, N.J., assignor to FMC Corporation, New York, N.Y.

Filed June 16, 1969, Ser. No. 833,676

Int. Cl. C01b *15/02;* **B01j** *11/08*

U.S. Cl. 23—207 **4 Claims**

An improvement in the catalytic hydrogenation of an anthraquinone working compound is obtained during the production of hydrogen peroxide by employing a hydrogenation catalyst containing 0.05 to 5 percent of palladium dispersed over the surface of alumina supporting spheres, said spheres having substantially no pores larger than about 0.06 microns in diameter, having a BET surface area of between 20 and 200 $m.^2/g.$, and having the palladium metal penetrating the pores of the support surface no greater than about 50 microns.

3,615,208

METHOD AND APPARATUS FOR CARBON BLACK PRODUCTION

John W. Byron, Borger, Texas

Filed Feb. 6, 1969, Ser. No. 797,212

Int. Cl. C 09c *1/50*

U.S. Cl. 23—209.4 **5 Claims**

Removal of grit from the gaseous mass in a carbon black furnace by passing the gaseous mass over a radial port or depression in the wall of the lower periphery of the furnace thereby entrapping the grit which is thereafter removed by means of a draw-off conduit.

3,615,209

METHOD OF GRAPHITIZATION

Mack P. Whittaker, Johnson City, and William F. Wilson, Elizabethton, both of Tenn., assignors to Great Lakes Carbon Corporation, New York, N.Y.

Continuation-in-part of application Ser. No. 782,762, Dec. 10, 1968, now abandoned. This application June 30, 1969, Ser. No. 837,951
Int. Cl. C01b *31/04*
U.S. Cl. 23—209.1 5 Claims

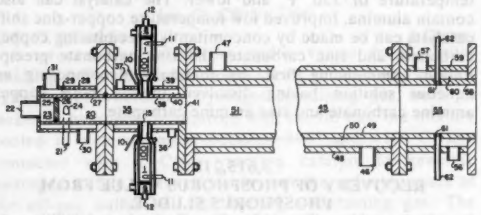
Alkaline earth metal and manganese compounds added to mixtures of sulfur-containing carbon and rare earth catalyst will drive the graphitization process to substantial completion at lower than normal temperatures. Calcium, added in the form of its oxide or of one of its salts in quantities dependent on the sulfur content of the carbon, is preferred.

3,615,210

PROCESS FOR PRODUCTION OF CARBON BLACK

Merrill E. Jordan, Walpole; Allan C. Morgan, Sudbury, and William G. Burbine, Whitman, all of Mass., assignors to Cabot Corporation, Boston, Mass.

Filed Apr. 2, 1970, Ser. No. 25,039
Int. Cl. C09c *1/50*
U.S. Cl. 23—209.4 16 Claims



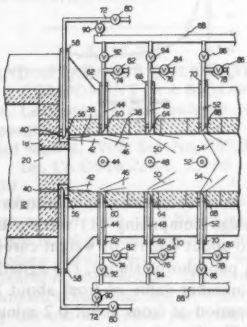
Process for the production of carbon black wherein a hydrocarbonaceous liquid feedstock is atomized by the injection thereof as a coherent penetrating stream transversely into an enclosed high energy gas stream produced by the combustion of a fuel and oxidant gas and thereafter conducting the thusly atomized feedstock traversely into a combustion product and/or oxygen-containing gas stream under carbon black forming conditions.

3,615,211

METHOD AND APPARATUS FOR MANUFACTURE OF CARBON BLACK

James E. Lewis, Houston, Tex., assignor to Ashland Oil, Inc., Houston, Ky.

Filed Jan. 12, 1968, Ser. No. 697,461
Int. Cl. C09c *1/50*
U.S. Cl. 23—209.4 11 Claims



A method and apparatus for producing carbon black from hydrocarbons in which a hydrocarbon feed stock, such as a liquid hydrocarbon oil, is converted to carbon black in a tunnel-type carbon black furnace, having a combustion zone whose diameter is greater than its axial length, a reaction zone whose diameter is substantially smaller than that of the combustion zone and which is substantially longer in axial length than the combustion zone and a restricted diameter choke, whose diameter is substantially smaller than the diameter of the reaction zone, between the combustion zone and the reaction zone, by burning a combustible mixture, such as a mixture of air and natural gas, in the combustion zone; mixing the flue gases from the burning of the combustible mixture with the feed stock to heat the feed stock prior to its passage through the restricted diameter choke and into the reaction zone; and injecting a quenching fluid, such as low-pressure steam, into the reaction zone, in progressively larger volumes, from the influent end to the effluent end of the reaction zone, including the introduction of a quantity of the quench fluid in the area of the reaction zone adjacent the juncture between the restricted diameter choke and the walls of the reaction zone itself, for example, by introducing the quench fluid at a plurality of points spaced from the juncture of the choke and the walls of the reaction zone to a point in the reaction zone at which the reaction mixture is generally quenched in accordance with the prior art. It is also contemplated that the angle which the injected quench fluid forms with the walls of the reaction zone should progressively increase from the influent to the effluent end of the reaction zone to form an annular veil of quench fluid defining a general cone shape with its base adjacent the influent end and its apex toward the effluent end.

3,615,212

METHOD OF MANUFACTURING CARBON FIBERS

Ian Whitney, Wirksworth, and John William Johnson, Allestree, Derby, both of England, assignors to Rolls-Royce Limited, Derby, England

Filed Mar. 5, 1969, Ser. No. 804,639
Claims priority, application Great Britain, Mar. 6, 1968, 10819/68
Int. Cl. C01b *31/07*
U.S. Cl. 23—209.4 16 Claims

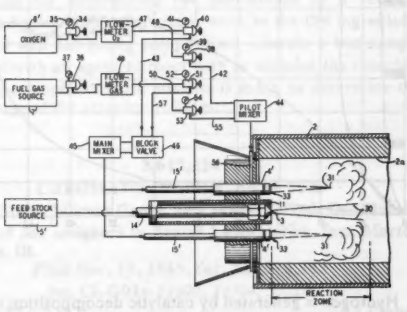
Polymeric fibers are heated to elevated temperatures in a bed of heated solid particles, as for instance hollow alumina ballotini. The bed is fluidized with a medium such as air as the fibers contact the heated bed. The method is useful to preoxidize or pyrolyze and optionally to postoxidize polymeric fibers such as polyacrylonitrile, ultimately producing carbon fibers of high strength.

3,615,213

METHOD AND APPARATUS FOR THE PRODUCTION OF CARBON BLACK

Thomas L. Shepherd, Essex Fells, N.J., assignor to Air Reduction Company, Incorporated, New York, N.Y.

Division of Ser. No. 504,776, Oct. 24, 1965, Pat. No. 3,477,816.
Filed May 1, 1969, Ser. No. 820,866
1969, Ser. No. 820,866
Int. Cl. C09c *1/48*
U.S. Cl. 23—209.4 2 Claims



An improved system for manufacturing carbon black in which a central nozzle, which emits a hydrocarbon spray, is

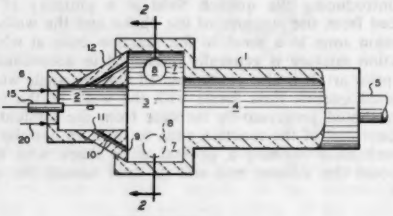
surrounded by a plurality of auxiliary nozzles from which high velocity oxy-fuel flames are emitted. The auxiliary nozzles are surrounded by pilot nozzles and pressure and flow regulating means are provided in the feed conduits to both the auxiliary nozzles and pilot nozzles surrounding same so as to enable independent control of the flow rate of the oxy-fuel mixture to said auxiliary and pilot nozzles.

3,615,214

CARBON BLACK PROCESS AND APPARATUS

Glenn J. Forseth, Borger, Tex.; Eulas W. Henderson, Bartlesville, Okla.; Robert E. Dollinger, Borger, Tex., and Sheldon A. Cunningham, Corvallis, Oreg., assignors to Phillips Petroleum Company

Filed Mar. 27, 1969, Ser. No. 810,965
Int. Cl. C09c *1/50*
U.S. Cl. 23—209.4 **10 Claims**



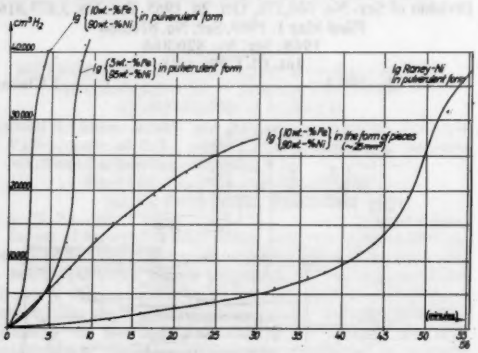
The production of carbon black by the pyrolytic decomposition of a hydrocarbon feed within a reactor having an axial zone, a precombustion zone, a combustion zone, and a reaction zone wherein flow of a portion of the reactants is established between the axial zone and the precombustion zone through at least one conduit connecting said zones.

3,615,215

RANEY CATALYST FOR GENERATING HYDROGEN BY DECOMPOSITION OF BORANES

Hans Von Dohren, Frankfurt am Main, and Andreas Basch, Niedereschbach, both of Germany, assignors to Varta Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 8, 1969, Ser. No. 882,966
Claims priority, application Germany, Dec. 12, 1968, P 18 14 108.7
Int. Cl. C01b *1/02, 1/25*
U.S. Cl. 23—211 **6 Claims**



Hydrogen is generated by catalytic decomposition of boron hydrides in the presence of a Raney catalyst having from 10 to 97.5 percent by weight of nickel and from 2.5 to 90 percent by weight of iron in the crystal lattice.

3,615,216

WATER GAS SHIFT PROCESS FOR PRODUCING HYDROGEN USING A CESIUM COMPOUND CATALYST

Clyde L. Aldridge, Baton Rouge, La., assignor to Esso Research and Engineering Company

Filed Mar. 26, 1968, Ser. No. 715,948
Int. Cl. C01b *1/02, 1/03*
U.S. Cl. 23—213 **7 Claims**

Cesium salts derived from acids having an ionization constant below 1×10^{-3} and carried on a support having high-surface area are used to catalyze the reaction $CO + H_2O \leftrightarrows CO_2 + H_2$ at temperatures between 400° and 700° F.

3,615,217

LOW TEMPERATURE COPPER-ZINC SHIFT REACTION CATALYSTS AND METHODS FOR THEIR PREPARATION

John F. O'Brien; Edward K. Dienes, and Arthur L. Hausberger, all of Louisville, Ky., assignors to Catalysts & Chemicals, Inc., Louisville, Ky.

Filed June 27, 1966, Ser. No. 560,827
Int. Cl. C01b *1/00;* **B01j** *11/00, 11/26*
U.S. Cl. 23—213 **4 Claims**

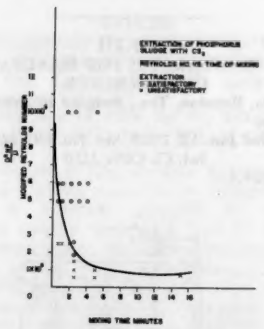
It is known that if a copper oxide-zinc oxide catalyst is made by specific techniques the catalyst when reduced at moderate temperatures permits a high conversion of carbon monoxide in water gas to hydrogen and carbon dioxide at a temperature of 550° F. and lower. The catalyst can also contain alumina. Improved low temperature copper-zinc shift catalysts can be made by concomitantly precipitating copper carbonate and zinc carbonate, the zinc carbonate precipitation commencing first, by thermally decomposing an aqueous solution having dissolved therein both copper ammine carbonate and zinc ammine carbonate.

3,615,218

RECOVERY OF PHOSPHORUS VALUE FROM PHOSPHORUS SLUDGE

Leo B. Post, New City, N.Y.; Roy E. Paul, and William R. Crudup, Columbia, Tenn., assignors to Stauffer Chemical Company, New York, N.Y.

Filed Aug. 5, 1968, Ser. No. 750,192
Int. Cl. C01b *25/04*
U.S. Cl. 23—223 **8 Claims**



A process for recovering phosphorus values from phosphorus sludge comprising (1) mixing the sludge with from about 1 to about 8 parts by weight carbon bisulfide per part by weight phosphorus sludge; (2) agitating the mixture to a Reynolds number value of from about 2×10^5 to about 1.0×10^6 for a period of from about 0.2 minute to about 16 minutes; (3) filtering the resulting mixture to remove particulate material and thereafter recovering the phosphorus value from the carbon bisulfide fraction.

3,615,219

SULFUR DIOXIDE REMOVAL FROM A GAS

Pranas Budininkas, Cicero; George A. Remus, Chicago, and Jack D. Zeff, Deerfield, all of Ill., assignors to General American Transportation Corporation

Filed July 2, 1968, Ser. No. 742,028
Int. Cl. C01b *17/04*
U.S. Cl. 23—226 11 Claims

A process that removes sulfur dioxide from a gas containing sulfur dioxide treats the gas at an elevated temperature in the presence of a reducing gas and a catalyst for the reaction between the reducing gas and sulfur dioxide. When gas containing sulfur dioxide, such as flue gas and smelter gas, contains oxygen gas above a very low concentration, it is necessary to modify the process either by the use of additional reducing gas or by a pretreatment of the gas so as to decrease selectively the oxygen gas content or by the use of both modifications.

3,615,220

PROCESS FOR RECOVERING SULFUR VALUES FROM PYRITES BY SMELTING

Robert F. Burke, Riverdale, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Apr. 1, 1969, Ser. No. 812,134
Int. Cl. C01b *17/06*
U.S. Cl. 23—224 4 Claims

A process for recovering sulfur values from pyrites smelting effected under nonoxidizing conditions using a carbon fuel wherein a hydrogen-containing gas, such as steam or hydrogen, is admixed with the off-gas, the mixture cooled to a temperature between 300° and 450° C. and contacted with a Claus reaction catalyst to generate hydrogen sulfide by reaction between the reducing gases of the off-gas, sulfur and the hydrogen-containing gas. The sulfur dioxide in the off-gas is then reacted with the hydrogen sulfide via the Claus reaction to produce elemental sulfur.

3,615,221

PROCESS FOR REDUCTION OF SULFUR DIOXIDE WITH HYDROCARBON VAPOR

Donald McMillan, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 21, 1969, Ser. No. 818,028
Int. Cl. C01b *17/04*
U.S. Cl. 23—226 7 Claims

A process is disclosed for reducing sulfur dioxide to hydrogen sulfide and sulfur by:

1. mixing sulfur dioxide with a hydrocarbon vapor;
2. preheating the mixture to 500°–560° C;
3. mixing the preheated material with the combustion products of a hydrocarbon;
4. converting a portion of the sulfur dioxide to hydrogen sulfide and sulfur; and,
5. cooling the converted material.

3,615,222

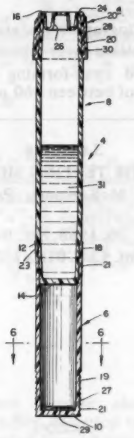
METHOD AND APPARATUS FOR MEASURING THE AMOUNT OF A COMPONENT IN A BIOLOGICAL FLUID

Louis W. Mead, Lexington, Mass., assignor to New England Nuclear Corporation

Filed Sept. 4, 1968, Ser. No. 757,340
Int. Cl. G01n *23/00*, *33/16*
U.S. Cl. 23—230 28 Claims

A technique for clinically measuring the amount of a component, such as thyroxine, in a biological fluid, such as serum, of the type in which the amount of such component bound to a binding agent therefor, such as a protein, is measured by measuring the capacity of the binding agent to bind a tracer labeled compound and in which such capacity is measured by the use of a solid particulate adsorbent or absorbent for selectively adsorbing or absorbing the unbound tracer labeled compound from a liquid containing the same together with the bound tracer labeled compound and the bound component, the improvement comprising mixing the solid adsorbent and liquid in a container in which the solid particulate adsorbent is secured to the upper end thereof and the liquid is contained in the lower end, the mixing being carried out by inversion of the container. By this procedure, it is possible to simultaneously mix the solids and liquids of a plurality of specimens and controls and to thereby simultaneously incubate and centrifuge them to insure that all specimens and controls are subjected to identical conditions to thereby minimize errors and the time required to carry out such measurements.

The compounds used for carrying out the tests may be conveniently stored and shipped in the same container in



which mixing, incubation, centrifuging and tracer measurement are carried out and which is in the form of a transparent or translucent, relatively rigid, tubular vial of a molded resin made up of two parts, in one of which is secured the adsorbent and in the other of which is located the liquid. During shipment and storage one part functions as a cap for the other, which is also capped and when the test is to be carried out, the parts are disassembled and reassembled with the open mouths of the two parts mated together to form a single chamber and with the solids-containing part located above the liquid-containing part so that the solids secured in the upper part do not come in contact with the liquid in the lower part until the container is inverted.

3,615,223

CEMENT RETARDER DETERMINATION

James E. Burrqughs, Mount Prospect, and William G. Kator, Des Plaines, both of Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed June 6, 1969, Ser. No. 831,061
Int. Cl. G01n *21/20*
U.S. Cl. 23—230 R 3 Claims

Method for determining the distribution of a retarder calcium lignosulfonate or tartaric acid, in the dry ingredients of an oil well-cementing composition, wherein a test sample is mixed with an agent to react with or dissolve the retarder, and a spectrophotometric analysis is made to determine the percentage of the retarder in the mix.

3,615,224

CHROMATOGRAPHIC ANALYSIS

Ivan J. Stern, Morton Grove, and Jawed Fareed, Des Plaines, both of Ill., assignors to Baxter Laboratories, Inc., Morton Grove, Ill.

Filed Nov. 13, 1969, Ser. No. 876,553
Int. Cl. G01n *21/00*, *31/04*, *33/16*
U.S. Cl. 23—230 B 12 Claims

A method for the microdetermination of 2,8-dioxyadenine in whole blood plasma by strong acid cation exchange resin

chromatography with a linear or stepwise gradient increase in concentration of HCl for elution.

3,615,225

COLOR PHOTOGRAPHIC MATERIAL

Rigobert Otto, Leverkusen; Hans-Heinrich Credner, Munich; Arthur Henri De Cat, Mortsel, and Walter Puschel, Leverkusen, all of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 3, 1968, Ser. No. 780,894

Claims priority, application Germany, Dec. 12, 1967, P 15 97 510.7

Int. Cl. G03c *1/40*

U.S. Cl. 96—100 **3 Claims**

Light-sensitive photographic material containing at least one silver halide emulsion layer which contains an effective amount of a colored cyan-forming coupler that has an absorption maximum of between 460 μ to about 510 μ.

3,615,226

METHOD OF TESTING SHORTENING

Nathaniel P. Apter, McKeesport, Pa., assignor to Apter Industries, Inc.

Filed Dec. 26, 1968, Ser. No. 786,912

Int. Cl. G01n *31/22*

U.S. Cl. 23—230 R **1 Claim**

A method of qualitatively testing the free fatty acid concentration of shortening, including the steps of admixing a measured volume of the shortening in a container of an alcohol-sodium hydroxide solution, including an alkaline indicator, and having a fixed alkaline concentration equivalent to a known concentration of free fatty acids; agitating the mixture; and observing any color change in the test solution.

3,615,227

METHOD FOR THE DETERMINATION OF DISTRIBUTION FACTORS

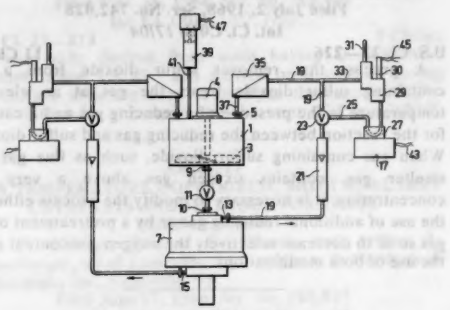
Helge Jan Arnold Rydberg, Molndal, and Hans Reinhardt, Goteborg, both of Sweden, assignors to Incentive AB, Stockholm, Sweden

Continuation of application Ser. No. 601,183, Dec. 12, 1966, now abandoned. This application May 5, 1969, Ser. No. 824,370

Int. Cl. B01d *11/04*; **G01n** *27/56*

U.S. Cl. 23—230 **3 Claims**

A method for investigating and controlling a two-phase liquid system, and for determining the partition factor of a substance between two substantially immiscible liquids. The liquids are intimately mixed in a mixing zone in the presence of the substance to be tested, said substance being introduced therein in any suitable manner. The liquids are separated into their two phases, the separator having one outlet for each phase. The individual phases are conducted to



corresponding testing stations where the concentration of said substance in each phase is measured.

3,615,228

GLUCOSE DETERMINATION METHOD EMPLOYING ORTHOTOLUIDINE

Bernard J. Thiegs, Indianapolis; Robert F. Mack, Indianapolis, Ind., and John Di Giorgio, Canoga Park, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 20, 1969, Ser. No. 878,573

Int. Cl. G01n *21/22, 31/22, 33/16*

U.S. Cl. 23—230 B **9 Claims**

An improved orthotoluidine reagent composition for use in determination of glucose in biological fluids effective sufficient hydrazine to provide a uniform intensity of color when the composition is reacted with a predetermined amount of glucose, such as a standard solution.

3,615,229

USE OF OXALIC ACID FOR THE HYDROLYSIS OF STEROID CONJUGATES IN PREGNANCY ANALYSIS

Paige K. Besch, Houston, Tex., and Nicholas Vorys, Columbus, Ohio, assignors to Searle Reference Laboratories, Inc.

Filed May 26, 1969, Ser. No. 827,955

Int. Cl. G01n *33/16*

U.S. Cl. 23—230 B **11 Claims**

A method for the determination of pregnancy estrogen concentrations by hydrolysis and/or cleavage of conjugated steroids found in urine by treatment with organic acids. The urine of a pregnant woman contains "placental estriols" that may be hydrolyzed with oxalic acid to liberate estrogens. The liberated estrogens are extracted into an organic solvent, which may be compared with standard concentrations of estriol by known colorimetric methods.

3,615,230

DEVICE FOR AUTOMATICALLY CARRYING OUT CHEMICAL ANALYSES

Rudolf Barnick, and Detlev Siemon, both of Uberlingen (Bodensee), Germany, assignors to Bodenseewerk Perkin-Elmer & Co. GmbH, Uberlingen (Bodensee), Germany

Filed Dec. 11, 1967, Ser. No. 689,516

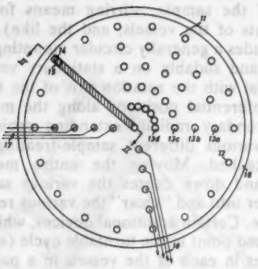
Claims priority, application Germany, Dec. 15, 1966, B 90 305

Int. Cl. B65b *43/60*

U.S. Cl. 23—253 R **8 Claims**

A method and apparatus for automatically carrying out chemical analyses. The apparatus comprises a series of sample holders, a dosing pump, a transporting device for guiding the sample holders past the dosing pump, a plurality of reaction vessels associated with each sample holder, and control means for moving the dosing pump relative to the

holders and for providing for withdrawal of an unmeasured quantity of sample from the sample holders and for



dispensing this sample quantity in smaller measured quantities into associated reaction vessels.

3,615,231

PROCESS UTILIZING THE SENSIBLE HEAT OF SMELTER GASES TO RECOVER SULFUR THEREFROM

John T. Cullom, 628 6th Ave., San Manuel, Ariz.

Filed June 18, 1969, Ser. No. 834,355
Int. Cl. C01b 17/06
U.S. Cl. 23—226 **8 Claims**

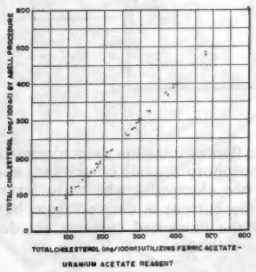
The sensible heat of sulfur dioxide-containing flue gas is utilized to generate steam and to preheat methane or an equivalent hydrocarbon, the steam and hot methane being catalytically reformed to produce hydrogen. The hydrogen thus produced is employed to reduce the sulfur dioxide content of the flue gas to hydrogen sulfide, the hydrogen sulfide being reacted with a further quantity of sulfur dioxide to produce elemental sulfur which is recovered.

3,615,232

METHOD AND REAGENT FOR DETERMINING TOTAL CHOLESTEROL IN BLOOD SERUM

Amritlal C. Parekh, and David H. Jung, both of Indianapolis, Ind., assignors to Research Corporation, New York, N.Y.

Filed Feb. 5, 1970, Ser. No. 8,954
Int. Cl. G01n 33/16
U.S. Cl. 23—230 B **10 Claims**


TOTAL CHOLESTEROL (mg/100ml) BY ABELL PROCEDURE
TOTAL CHOLESTEROL (mg/100ml) UTILIZING FERRIC ACETATE-URANIUM ACETATE REAGENT

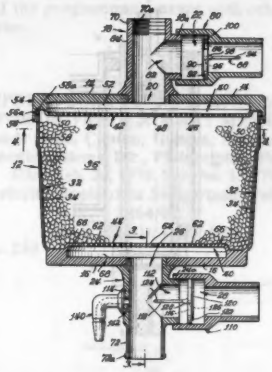
In a method for the determination of total cholesterol in blood serum, plasma or other cell free body fluid the steps of adding a reagent comprising a mixture of ferric acetate [$Fe(C_2HO_2)_3$] and uranium acetate [$UO_2(C_2H_3O_2)_3$] to the fluid whereby the total cholesterol content thereof is solubilized and those chromogens which interfere with the determination are precipitated and separating the liquid phase containing solubilized cholesterol from the precipitate. The cholesterol content is then determined quantitatively, preferably colorimetrically, employing as a color-developing reagent a mixture of ferrous sulfate and sulfuric acid. The invention also includes the ferric acetate-uranium acetate reagent and the ferrous sulfate-sulfuric acid color reagent.

3,615,233

DISPOSABLE CARBON DIOXIDE ABSORBER

William E. Doering, Chicago, Ill., and Gary K. Porter, Hatboro, Pa., assignors to Chemetron Corporation, Chicago, Ill.

Filed July 28, 1969, Ser. No. 845,355
Int. Cl. B01j 1/24
U.S. Cl. 23—252 R **18 Claims**



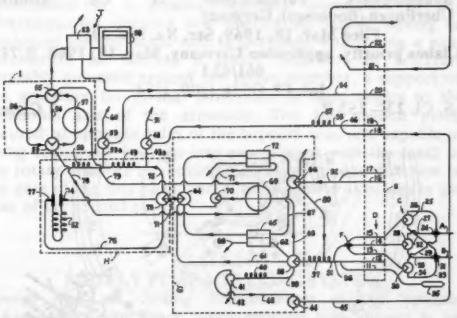
A disposable carbon dioxide absorber having self-contained valves and being designed to be used once and then disposed of in order to eliminate certain hazards of reinfection and cross-infection.

3,615,234

SYSTEM FOR PROCESSING AND ANALYZING BIOLOGICAL SAMPLES

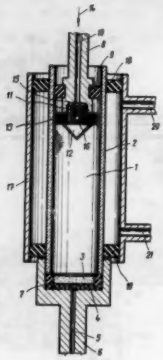
Frants J.B.T. Ludvigsen, Greenville, S.C., assignor to Technicon Corporation, Tarrytown, N.Y.

Filed May 28, 1968, Ser. No. 732,731
Int. Cl. G01n 33/16
U.S. Cl. 23—253 **4 Claims**



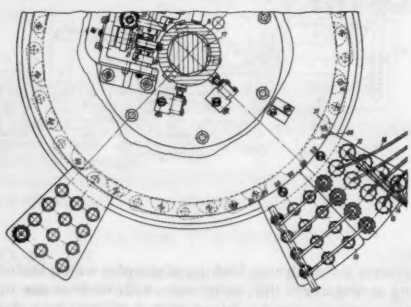
A system for analyzing biological samples which includes a valving arrangement that cooperates with various size tubing so that a sample can be mixed with a diluent to a desired degree of concentration. The system is adapted to be programmed so that reagents and the like can be added to the sample according to the test being run.

3,615,235
THROUGH-FLOW REACTOR
Jiri Hrdina, Prague, Czechoslovakia, assignor to Ceskoslovenska akademie ved, Prague, Czechoslovakia
Filed Oct. 8, 1968, Ser. No. 765,830
Claims priority, application Czechoslovakia, Oct. 9, 1967, PV 7129-67
Int. Cl. G01n *31/22, 31/08, 33/16*
U.S. Cl. 23—253 R 9 Claims



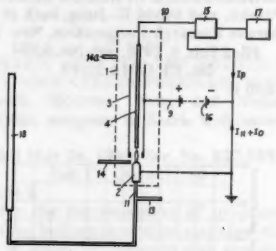
A through-flow reactor which forms a part of an analyzer of substances such as amino acids delivered from a chromatographic column where they have been divided into zones having sharp concentration gradients. The reactor includes a tubular body having an inlet end and an outlet end, the tubular body containing a porous packing material, the inlet end of the tubular body housing a porous body above and bearing on the porous packing material and separating the source of the substances undergoing analysis from the porous packing material of the reactor and the outlet end housing a porous body below and bearing on the porous packing material, the porous packing material and each porous body being nonchemically reactive with the substances flowing through the reactor. This reactor construction reduces distortion of the concentration gradients as they pass through the reactor.

3,615,236
APPARATUS FOR AUTOMATIC CHEMICAL ANALYSES
Rolf Tamm, Mimmenhausen, Germany, assignor to Bodenseewerk Perkin-Elmer & Co. GmbH, Uberlingen (Bodensee), Germany
Filed Mar. 18, 1969, Ser. No. 808,095
Claims priority, application Germany, Mar. 19, 1968, B 75 061/42 1
Int. Cl. G01n *1/00, 1/14*
U.S. Cl. 23—253 R 7 Claims



Automatic chemical analyses apparatus includes a known turntable carrying a circumferentially arranged large series of (radial arrays of) reaction vessels, into each of which a sample is placed, and at other rotational positions of the turntable various "sample-treating" means are located (including means for adding reagents, means for sucking off all or part of the sample, stirring means for mixing the various contents of the vessels, and the like). The present apparatus includes a generally circular mounting plate, above the turntable and slidable on a stationary vertical guiding column (coaxial with the rotation axis of the turntable). At various circumferential positions along the mounting plate periphery, secondary radially extending projection plates, carrying the various different sample-treating devices are removably attached. Moving the entire mounting plate assembly up and down causes the various sample-treating devices to enter into and "clear" the various reaction vessels in the turntable. Certain additional devices, which are always utilized at a fixed point in the turntable cycle (e.g., means for placing samples in each of the vessels in a particular radial array) may be positioned in between the various peripherially attached secondary projections, without causing any problems of physical interference, since the mounting plate and its projections do not rotate, but only the underlying turntable with its reaction vessels. The various peripherially attached secondary "projections" may be disconnected and moved to different circumferential positions on the main-mounting plate (or projections carrying different sample-treating devices interchanged in an analogous manner), thereby affording great versatility as to the different types and timing of steps of analyses performed by the described apparatus.

3,615,237
FLAME IONIZATION DETECTOR
Frank P. Speakman, Cambridge, England, assignor to Pye Limited, Cambridge, Mass.
Filed Oct. 18, 1968, Ser. No. 768,788
Claims priority, application Great Britain, Oct. 31, 1967, 49512/67
Int. Cl. G01n *31/12*
U.S. Cl. 23—254 E 4 Claims

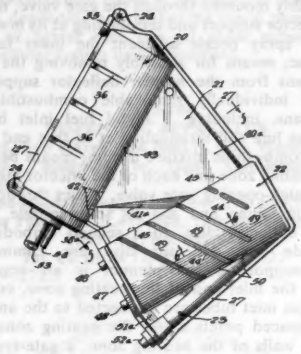


A thermionic flame ionization detector, particularly for the detection of phosphoro-organic compounds and comprising a flame jet and two electrodes which are arranged such that the wanted ionic current is derived from between the two electrodes and the unwanted currents are derived between one electrode and the jet.

3,615,238
OXYGENATOR
Donald J. Bentley, c/o Bentley Laboratories 3107 S. Kilson St., Santa Ana, Calif., and Richard A. De Wall, 247 Northview Road, Dayton, Ohio
Division of Ser. No. 601,000, Dec. 17, 1966, Pat. No. 3,488,158.
Filed Sept. 11, 1969, Ser. No. 857,044
application Sept. 11, 1969, Ser. No. 857,044
Int. Cl. A61m *1/03*
U.S. Cl. 23—258.5 17 Claims

An improvement in a unitary blood oxygenator of the type having an oxygenating chamber, a settling chamber and a heat exchange chamber in communication with each other characterized by ribs formed in the oxygenating chamber for positioning the debubbling sleeve spaced from the walls of

the chamber; further characterized by the provision of a settling chamber of reduced volume, preferably being thin in horizontal cross section and further characterized by



refinements in the heat exchange jacket about the heat exchange chamber in the form of angularly oriented, indented ribs in the shell of the heat exchange chamber.

3,615,239

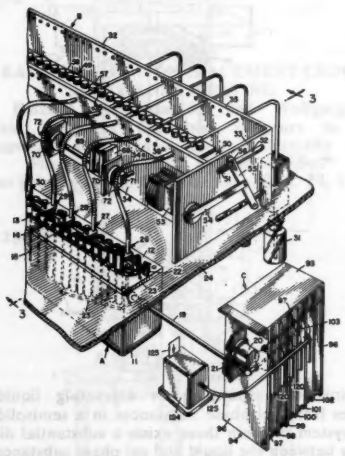
AUTOMATED ANALYZER AND PROGRAMMER THEREFOR

Alan R. Jones, Miami, and Charles W. Chapman, Miami Lakes, both of Fla., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Mar. 12, 1969, Ser. No. 806,589

Int. Cl. B01l *9/06, 11/00;* **G01n** *1/10*

U.S. Cl. 23—259 **19 Claims**



An apparatus especially suited for use in automated chemical analysis wherein the operations of delivering fluids to sample tubes and of extracting fluids from such tubes are programmed by mechanical-electrical programming means. Such programming means includes a plurality of rotatable elements each equipped with a multiplicity of spring fingers. Each rotatable element corresponds with the treatment means at a sample tube treatment station and each of the multiple fingers is representative of a single sample tube advanced through such treatment stations. The fingers are adapted to sweep over contacts representative of the stopping stations of the sample tubes and when a selected tube reaches its particular treatment station a finger of the rotatable member corresponding with the treatment means at that station makes electrical contact to produce a signal which energizes such treatment means. The apparatus also includes means for shifting the spring fingers between operative and inoperative positions and for synchronizing the operation of the programming means with other components of the analyzer.

3,615,240

MICROPIPETTE COMPRISING A PAWL MECHANISM FOR DRIVING A ROTARY MEMBER

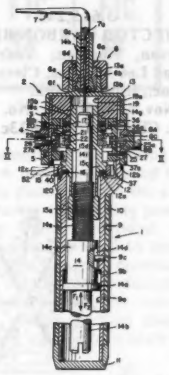
Manuel Claude Sanz, Canton, Geneva, Switzerland, assignor to Micromedic Systems, Inc., Philadelphia, Pa.

Filed Feb. 24, 1970, Ser. No. 13,779

Claims priority, application Switzerland, Feb. 26, 1969, 2864/69

Int. Cl. G01n *1/00, 1/14*

U.S. Cl. 23—259 **25 Claims**



A device for drawing and distribution of liquid, as exemplified in a pipette, operated alternately in two directions, for drawing and distributing liquid, having an enclosure for the liquid storing purposes, comprising a pawl mechanism for driving a rotary member, an armature rotatably mounted around the rotary member, a support on the armature for pivotal movement at right angles to the rotational axis of the armature, first and second pawls secured to opposite sides of the support axis, and capable of being selectively brought into engagement with the teeth of the rotary member by rocking the support in one direction in the case of the first pawl, and in the opposite direction in the case of the second pawl.

3,615,241

FIREFLY PUMP-METERING SYSTEM

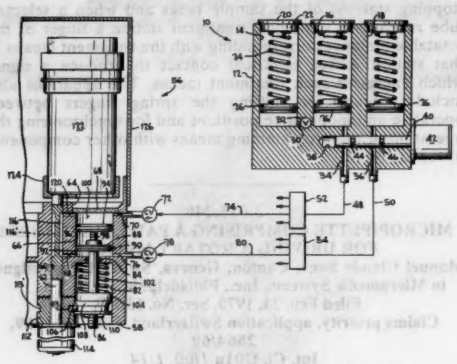
George M. Low, Acting Administrator of the National Aeronautics and Space Administration with respect to an invention of, and Chris J. Plakas, 304 Holiday Park Drive, Apt. #276, Champaign, Ill.

Int. Cl. G01n *1/14;* **B67d** *5/16*

U.S. Cl. 23—259 **6 Claims**

A pumping and metering dual piston system for simultaneously injecting controlled amounts of sample and reactants into a reaction chamber and an enzyme into an adjacent injection chamber. A rotary shaft is actuated to communicate the injection chamber with the reaction chamber and to actuate a mechanism for forcing the enzyme from the injection chamber to the reaction chamber.

Additionally, the shaft supports and operatively rotates detector apparatus from a magnetic and light radiation



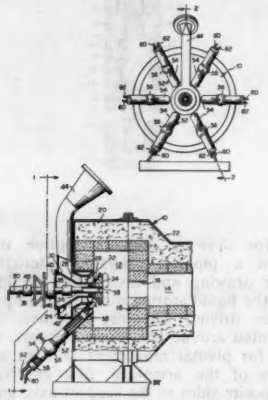
shielded position to a position for monitoring the reaction chamber constituents.

3,615,242

MULTIPLE-INJECTOR CARBON BLACK FURNACE

Robert M. Anderson, Houston; Andrew L. Askew, Jr., Houston, Tex., and Lee A. Kline, Cleveland, Ohio, assignors to Ashland Oil, Inc., Houston, Tex.

Filed Nov. 4, 1968, Ser. No. 773,057
Int. Cl. C09c 1/50; F23c 5/06
U.S. Cl. 23—259.5 17 Claims



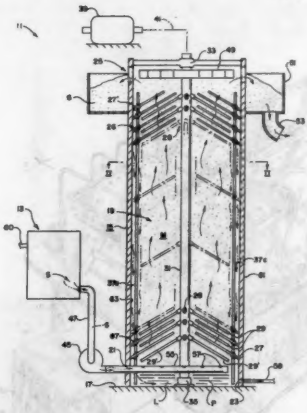
A furnace-type carbon black reactor, including, a large-diameter, short axial length, cylindrical heating zone, a smaller diameter, greater axial length, cylindrical reaction zone connected to the effluent end of the heating zone, an orifice ring mounted in the reaction zone at the juncture of the heating zone and the reaction zone, an opening in the inlet end of the combustion zone, a streamlined, generally dumbbell-shaped central combustion-supporting gas guide, having the neck thereof passing through the opening in the heating zone, a generally disc-shaped combustible mixture deflector mounted adjacent the inner end of the central guide, the walls of the heating zone surrounding the neck of the central guide being contoured to form a streamlined annular space about the central guide, a combustion-supporting gas plenum surrounding the rearward end of the central guide and in open communication with the annular space about the central guide, an opening through the center of the central guide, and the deflector, a hollow tubular deflector support connected to the disc-shaped deflector and slideably mounted through the center of the central guide, adjusting means for moving the tubular deflector support and the deflector forwardly and rearwardly with respect to the end walls of the heating zone, a gate-type valve means mounted on the tubular deflector support near the rearward end thereof, a removable, elongated feedstock injection means slideably mounted through the gate valve, through the tubular deflector support and terminating at its inward end in a feedstock spray nozzle adjacent the inner face of the deflector disc, means for slideably removing the feedstock injector means from the tubular deflector support, and a plurality of individually removable combustible mixture injector means, including, a liquid fuel inlet line and a dispersing gas line and terminating at its free end in a spray nozzle, the combustible mixture injector means being spaced about the heating zone and each of the injector means passes through a quick-opening gate valve, passes through the wall of the heating zone and has its spray nozzle positioned behind the deflector disc. In a second embodiment, the central guide and deflector disc are eliminated, the combustion-supporting gas plenum is an annular tube surrounding the inlet end of the heating zone, combustion-supporting gas inlet tubes are connected to the annular tube at radially spaced points about the heating zone and pass through the walls of the heating zone, a gate-type valve is mounted in each combustion-supporting gas tube, and individually removable combustible mixture injector means are slideably mounted through the combustion supporting gas tubes and gate valves and include a liquid fuel inlet line, a dispersing gas inlet line and a spray nozzle at the inner, terminal end of the injector means.

3,615,243

APPARATUS FOR EXTRACTING LIQUID FROM A MOBILE SEMISOLID CELLULAR SYSTEM

Clarence W. Scott, 435 N. Highland #3, Memphis, Tenn.

Filed May 22, 1969, Ser. No. 827,001
Int. Cl. B01d 11/02, 9/04; B01f 5/26
U.S. Cl. 23—267 5 Claims



Apparatus for separating or extracting liquid phase substances from gel phase substances in a semisolid mobile cellular system wherein there exists a substantial difference in density between the liquid and gel phase substances of the system. The apparatus is particularly useful for separating or deliquoring black liquor soap substances manufactured in a chemical pulping operation. The apparatus, in a preferred form, includes a long tall cylindrical vessel or tank, a vertical rotor mounted on the vertical center axis of the tank interior having a series of press rods radially fixed cantilever fashion on the rotor shaft and projecting toward the cylindrical interior tank wall, a second series of press rods generally cantilever fixed to the tank wall interior and projecting radially toward the rotor axis and alternatingly arranged with

the movable radially extending rotor press rods. The semisolid cellular soap substance or the like is pumped into the tank and the rotor driven at a slow speed (3–5 r.p.m.) to cause the cellular substance to be squeezed between the alternatingly arranged fixed and movable press rods. This causes the liquid phase substance to collect on the trailing side of each of the press rods and the liquid to be conducted to a liquid pool formed either at the upper or lower elevation of the tank depending on whether the liquid phase substance is heavier or lighter than the gel phase substance in the semisolid cellular system being processed.

3,615,244

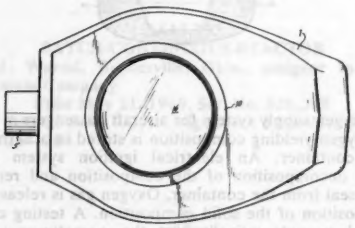
DISPENSING APPARATUS

Alfred Long, New Haven, and Noel N. Coe, Woodbridge, both of Conn., assignors to Olin Mathieson Chemical Corporation

Continuation-in-part of application Ser. No. 689,974, Dec. 12, 1967, now Patent No. 3,495,948. This application July 18, 1969, Ser. No. 842,941

Int. Cl. B01d *11/00, 15/02, 59/22*

U.S. Cl. 23—272.7 2 Claims



This dispenser divides an inlet fluid stream and flows a first, larger portion of the inlet stream through a first chamber and a second, smaller portion of the inlet stream through a second chamber. The previous end of an adjustably positioned, solute-containing magazine extends into the second chamber and is contacted by the second, smaller portion of the inlet stream to dissolve the solute. The first and second portion streams are recombined and discharged.

3,615,245

APPARAUTS FOR ROD DISPLACEMENT CRUCIBLE-FREE ZONE MELTING

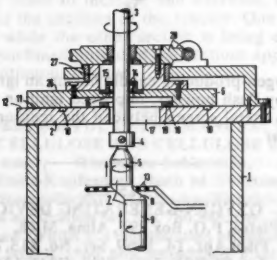
Reimer Emeis, Ebermannstadt, and Wolfgang Keller, Pretzfeld, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Sept. 22, 1967, Ser. No. 669,967

Claims priority, application Germany, Sept. 24, 1966, S 106085

Int. Cl. B01j *17/10*

U.S. Cl. 23—273 SP 6 Claims



Apparatus for crucible-free zone melting a crystalline rod comprising a melting zone chamber having a substantially horizontal wall formed with an opening therein, a slide member adjacent the horizontal wall outside of the chamber for sealingly covering the opening, a pair of spaced holders mounted in the chamber for vertically end supporting a crystalline rod between them, means for relatively displacing the end holders toward one another, an annular heating device surrounding and spaced from the rod and adapted to form a molten zone in the rod wherefrom a portion of the rod recrystallizes, means for displacing the slide member and the rod holder for the recrystallizing rod portion in a substantially horizontal direction transverse to the axis of the rod, and means for rotating at least the rod holder for the recrystallizing rod portion comprising a drive shaft extending vacuum-tightly through an opening in the slide member and the opening in the wall and connected to the rotatable holder in the chamber.

3,615,246

STEADY STATE ETCHING SYSTEM

Robert T. Lindstrom, Orlando, Fla., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 604,940, Dec. 27, 1966, Pat. No. 3,505,135. Filed Oct. 8, 1969, Ser. No. 870,900

1969, Ser. No. 870,900

Int. Cl. B01d *9/02*

U.S. Cl. 23—273 6 Claims

A steady state system for the etching of printed circuit boards is provided. A metal is removed from an etchant at the rate in which it is dissolved into the etchant and etching reagent consumed during the etching process is replaced at an equivalent rate. Also provided is an improved crystallization tower which is used to continuously remove the dissolved metal. The tower is provided with a series of adjustable baffles to vary the inner diameter of the tower to control crystal size throughout the column. Additionally, there is included a crystal ejection chamber from which precipitated crystals are ejected by a centrifugal force.

3,615,247

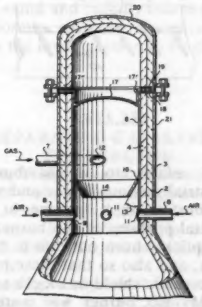
MODIFIED COMBUSTION ZONE IN A THERMALLY INSULATED APPARATUS

George J. Steeves, Pasco, and William C. Crawford, Kennewick, both of Wash., assignors to Phillips Petroleum Company

Filed Dec. 23, 1968, Ser. No. 785,950

Int. Cl. F27d *1/12, 3/00;* F23d *15/02*

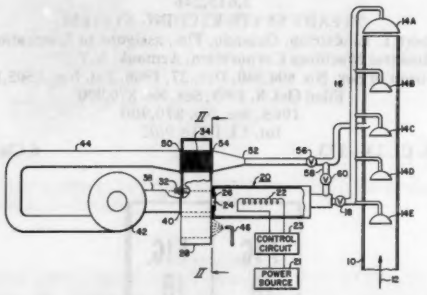
U.S. Cl. 23—277 C 6 Claims



A canopylike insert is placed intermediate the combustible gas inlet and the air inlet in a thermally insulated reactor to

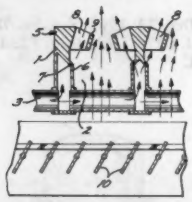
prevent burnout of the insulation by directing the flow of combustible gas into contact with air at a position removed from the reactor lining. A false dome may also be provided near the reactor closure means to prevent gasket burnout.

3,615,248
SMOKE CONTROL SYSTEM
George J. Holler, Jr., 210 S. Marietta St., St. Clairsville, Ohio
Filed Jan. 12, 1970, Ser. No. 2,163
Int. Cl. F23g 7/06
U.S. Cl. 23—277 C 6 Claims



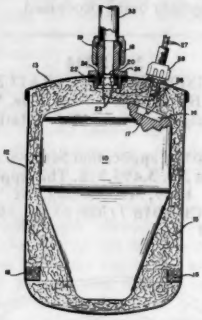
A smoke control system utilizing an afterburner and a filter formed from expanded blast furnace slag, the filter being in the form of a cartridge carried with other filter cartridges in a rotatable drum assembly whereby a clean filter can be rotated into position to permit products of combustion to pass therethrough while dirty filters are rotated to a position where they can be cleaned automatically for reuse.

3,615,249
GAS BURNER FOR FUMES AND THE LIKE
Arthur E. Martois, 2279 W. 233rd St., Torrance, Calif.
Filed Apr. 22, 1970, Ser. No. 30,762
Int. Cl. F23g 7/06
U.S. Cl. 23—277 C 5 Claims



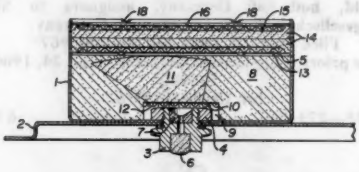
This invention relates to a gas burner for mixing combustible industrial noxious fumes and vapors with gases and air for combustion in a furnace to thus reduce air pollution. The metal portions of the burner are constructed so that they will quickly burn out due to high temperatures within the furnace, and also so that these metal parts will be protected with a ceramic shield or blocks to prevent damage to the burners. My gas burner will materially reduce air pollution from industrial plants, packing houses, etc., which emit combustible and noxious vapors into the air, which can be readily burned when they are passed through a burner together with the natural gas and air which is burned in these devices.

3,615,250
SUPPLEMENTAL OXYGEN SUPPLY SYSTEM
Richard L. Vernon, Glendale, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.
Filed Mar. 26, 1969, Ser. No. 810,656
Int. Cl. B01j 7/00
U.S. Cl. 23—281 8 Claims



An oxygen supply system for aircraft passengers in which a solid oxygen-yielding composition is stored in a hermetically sealed container. An electrical ignition system initiates thermal decomposition of the composition and removes a fusable seal from the container. Oxygen gas is released upon decomposition of the solid composition. A testing circuit is provided to automatically test the operativeness of the ignition system and the fusable container seal. A plurality of containers, linked to a common activating and testing system, provide oxygen for an aircraft passenger compartment.

3,615,251
OXYGEN-PRODUCING CANDLE
Frederick K. Klenk, Forward Township, Butler County, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.
Filed Dec. 11, 1969, Ser. No. 884,221
Int. Cl. B01j 7/00
U.S. Cl. 23—281 4 Claims

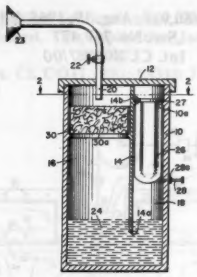


In an oxygen-producing candle having an ignition core that is ignited by flash powder, improved ignition is obtained by disposing a metal screen between the ignition core and the flash powder.

3,615,252
OXYGEN-GENERATING DEVICE
Anita J. DiPietro, P.O. Box 295, Alma, Mich.
Filed Apr. 14, 1969, Ser. No. 815,765
Int. Cl. B01j 7/02, 7/00; C01b 13/02
U.S. Cl. 23—282 11 Claims

An oxygen-generating device comprising a canister which has oxygen-generating material for reacting with a reacting agent, preferably water, which is placed in a closed pierceable container also disposed in the canister. Means for releasing the reacting agent, preferably a needle, is mounted

in the canister for piercing the container to release the reacting agent to the oxygen-generating material. A filter is



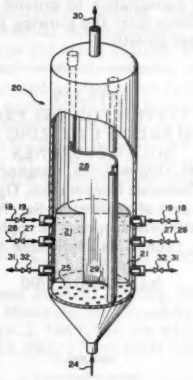
included to filter the impurities from the oxygen gas before it passes through valved outlet means.

3,615,253

BATCH-CONTINUOUS REACTOR

Fred M. Warzel, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed May 21, 1969, Ser. No. 826,399
Int. Cl. B01j *9/20;* **C08g** *35/00;* **F26b** *17/00*
U.S. Cl. 23—284 **4 Claims**



Material increases in throughput and output of batch-type reactors are obtained by avoiding operational time losses in dumping and filling and startup. The improvements are achieved by a flexible divider which extends upwards from the bottom of the unit and which moves from one side of the reactor to the other to increase and decrease, respectively, the volumes of the sections of the reactor. One section can be functional while the other section is being emptied and refilled. The combined output of the sections approaches the output of a continuous reactor.

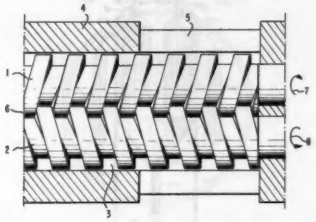
3,615,254

SCREW PRESS USEFUL IN THE MANUFACTURE OF ALKALI CELLULOSE AND CELLULOSE ETHERS

Franz Eichenseer, Wiesbaden-Schierstein, and Hans Kletschke, Essen-Kupferdreh, both of Germany, assignors to Kalle Aktiengesellschaft, Wiesbaden-Biebrich, Germany

Division of application Ser. No. 786,843, Dec. 20, 1968, now abandoned , which is a continuation of application Ser. No. 547,659, May 4, 1966, now abandoned. Filed Sept. 29, 1969, Ser. No. 864,269
Claim priority, application Germany, May 6, 1965, K 56022.
Int. Cl. B01j *1/00;* **B28b** *1/10;* **C08b** *11/20*
U.S. Cl. 23—285 **3 Claims**

This application discloses a new modification of a two-screw press of the known type in which the screws are of the Mapre type, i.e. have a rectangular thread profile. The modification concerns the depth of the thread. Its use is advantageous for promoting the reaction of fibrous cellulose



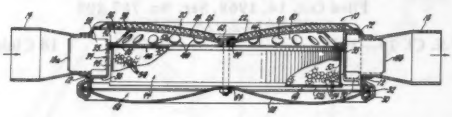
with alkali, or with alkali and with a liquid or solid etherifying agent, or for promoting the reaction of fibrous alkali cellulose with a liquid or solid etherifying agent.

3,615,255

CATALYTIC CONVERTER

Lester E. Patterson, Grand Blanc; William L. Alley, Flushing, and Michael R. Foster, Davison, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 19, 1970, Ser. No. 38,771
Int. Cl. F01n *3/14*
U.S. Cl. 23—288 F **3 Claims**



A catalytic converter having an outer cylindrical housing and an inner cylindrical element adapted to receive in spaced relationship thereto a flat cylindrical catalyst element and having three distinct manifold portions: an annular portion between the housing and the element, an inner portion above the catalyst element and a lower portion below and surrounding the catalyst element. The annular portion communicates with the inner portion through a plurality of holes in the inner element and the inner portion communicates with the lower portion through the catalyst element whereby exhaust gases entering the annular portion are distributed around and radially into the inner portion and then flow uniformly downwardly through the catalyst element and into the lower portion to be discharged from the converter.

3,615,256

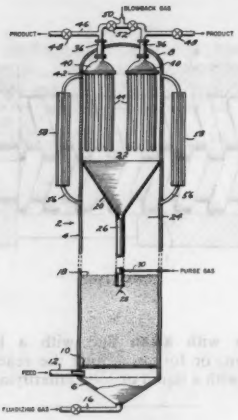
SYSTEM FOR SEPARATING CATALYST FROM A FLUID BED REACTOR

George M. Miller, Winchester, and Constantine D. Miserlis, Arlington, both of Mass., assignors to The Badger Company, Inc., Cambridge, Mass.

Filed Apr. 21, 1969, Ser. No. 817,785
Int. Cl. B01j *9/20;* **B01d** *46/04, 46/24*
U.S. Cl. 23—288 S **10 Claims**

System for stripping catalyst dust from the effluent stream of a fluid catalyst bed reactor, including an enclosed separation chamber in the reactor above the fluid bed, a plurality of cooling conduits mounted outside the reactor for carrying the effluent plus entrapped catalyst dust from the reactor to the separation chamber; and, within the chamber,

one or more filtering means for stripping catalyst dust from the effluent, the effluent being continuously removed from



the separation zone via the filtering means and the separated catalyst dust being returned to the fluid bed.

3,615,257

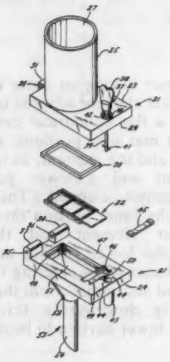
FILTER CASSETTE AND HOLDER THEREFOR

John K. Frost, Lutherville, Md.; John Kitzie, Clifton, and Dewey H. Palmer, Oradell, N.J., assignors to Becton, Dickinson and Company, East Rutherford, N.J.

Filed Oct. 14, 1968, Ser. No. 767,205

Int. Cl. B01d *23/28;* B01l *11/00*

U.S. Cl. 23—292 **18 Claims**



Filter cassette which basically includes a base frame composed of a bottom and extending sides from a portion of the perimeter of the bottom to form a chamber for receiving a precut filter. The bottom has means which aids in supporting the filter within the chamber and aids in permitting the fluid to drain from the underside of the filter. The base frame also has means upon it for mounting a resilient retaining frame. The retaining frame has a central opening and is adapted to be resiliently mounted upon the base frame. The base frame and the retaining frame cooperate to retain the filter between them in the chamber while permitting fluid to pass through the filter. A holder is provided to support the cassette during the filtration process.

3,615,258

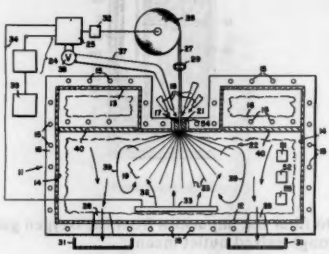
MAKING FIBERS FROM ELECTROSTATICALLY CHARGED VAPOR

John P. Glass, c/o Cava Industries, 79 La Grange Ave., Essington, Pa.

Division of Ser. No. 480,918, Aug. 19, 1965. Filed Oct. 17, 1968, Ser. No. 769,477

Int. Cl. B01d *7/00*

U.S. Cl. 23—294 **10 Claims**



Method of making fibers by crystallization from vapor comprising creating a vapor of fiber-producing material, forming a plurality of growing elongated fibers by condensing fibrous crystals from the vapor in a growing zone, constraining the fibers into s strand, dispersing and separating the ends of the fibers by applying an electrostatic charge thereto so that the ends are separated and individually exposed to vapor, measuring the rate of growth of the fibers by measuring the capacitance to ground of the fibers, and withdrawing the fibers from the growing zone in accordance with the rate of fiber growth.

3,615,259

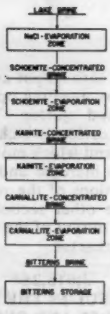
SOLAR POND SYSTEM FOR THE PRODUCTION OF CONCENTRATED BRINES UTILIZING PLURAL SERIAL SOLAR SUBZONES

Ulrich E. G. Neitzel, Odgen, Utah, assignor to Great Salt Lake Minerals and Chemicals Corporation, Ogden, Utah

Continuation-in-part of application Ser. No. 735,840, June 10, 1968, Continuation-in-part of application Ser. No. 756,071, Aug. 28, 1968. This application Mar. 17, 1969, Ser. No. 807,573

Int. Cl. B01d *9/00*

U.S. Cl. 23—298 **10 Claims**



A solar evaporation zone receives a brine of a given concentration with respect to a particular soluble salt and produces effluent brine of a higher concentration with respect to that salt. A crystal crop of other salts, characterized by a propensity to entrain a high weight-percent of brine, is deposited in the zone. The zone is subdivided into a plurality of subzones arranged for series flow so that the densest brine in the evaporation zone is contacted by a relatively small portion of the crystal crop. As a result, the yield of concentrated brine from the evaporation zone is increased.

3,615,260

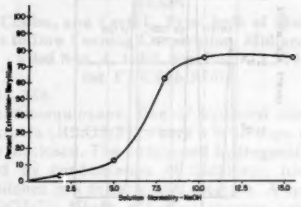
LEACHING BERYLLIUM

Charles K. Hanson, Salt Lake City, Utah, and Milton E. Wadsworth, Manila, Philippines, assignors to University of Utah

Continuation-in-part of application Ser. No. 554,459, June 1, 1966, now abandoned. This application Jan. 2, 1969, Ser. No. 805,073

Int. Cl. C01f 3/00; C01b 33/24

U.S. Cl. 23—299 3 Claims



A method of leaching beryllium from beryllium ore and separating the beryllium from contaminates in the leach liquor, the leaching method comprising exposing beryllium ore to a concentrated caustic solution under elevated temperature conditions. The beryllium along with certain contaminates is separated from the leach liquor by (a) diluting the solution, adding calcium chloride or other soluble calcium salt, and coprecipitating beryllium, calcium hydroxide and other contaminates, or by (b) diluting the solution, adding calcium hydroxide, or calcium oxide and heating in an autoclave to suitable temperature for an appropriate time interval. Contaminates, including silica, may be removed from the leach solution by adding calcium hydroxide (or oxide) without reducing the pH (without diluting the solution) and heating in an autoclave at suitable temperature for an appropriate time interval. The beryllium under these conditions remains in the solution. Under conditions (a) or (b) the precipitate which includes the beryllium is treated by common chemical procedures for isolation of the beryllium as beryllium hydroxide.

3,615,261

METHOD OF PRODUCING SINGLE SEMICONDUCTOR CRYSTALS

Donald R. Causey, and John R. Lenzing, both of Scottsdale, Ariz., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Apr. 2, 1969, Ser. No. 812,897

Int. Cl. B01j 17/00; H01l 7/40

U.S. Cl. 23—301 SP 10 Claims

A method of making an ingot length of a single semiconductive crystal having substantially uniform resistivity throughout most of the length of the ingot is disclosed. An inert helium atmosphere is placed about a mass of silicon material and then the silicon mass is melted. A seed of silicon is inserted into the melt and withdrawn at a rate which provides a substantially uniform ingot diameter. As the seed is withdrawn from the melt, the pressure in the system is slowly reduced to vaporize the impurity from the melt so as to maintain a substantially constant impurity concentration in the melt during the formation of the ingot.

3,615,262

CRYSTAL SEED FOLLOWING A HYPERCYCLOID PATH IN MELT

Rudolf Kappelmeyer, Oberhaching near Munich; Max-Hugo Kellerbauer, Munich, and Karl Danassy, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin, Germany

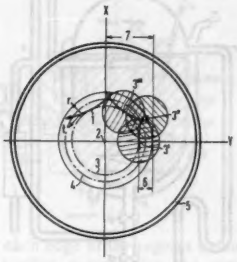
Filed Sept. 26, 1968, Ser. No. 762,992

Claims priority, application Germany, Oct. 4, 1967, S 112259

Int. Cl. B01j 17/18

U.S. Cl. 23—301 SP 5 Claims

Described is a method of producing a monocrystal rod, which is vertically held at its end, with homogeneous or almost homogeneous doping, by pulling from a crucible according to the Czochralski method. The holder of the seed crystal, which is immersed into the melt, is given an eccentric movement with respect to the melt contained in the crucible. According to the invention the holder of the seed crystal



which moves along the eccentric path is given an additional movement which produces a hypercycloid path with respect to the melt.

3,615,263

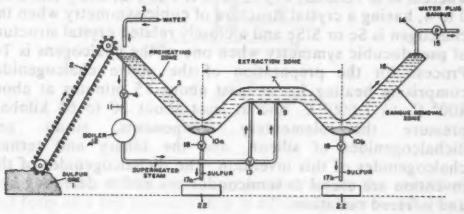
SULFUR RECOVERY

Ruel Carlton Terry, Houston, Tex., assignor to Allied Chemical Corporation, New York, N.Y.

Filed Feb. 27, 1969, Ser. No. 802,817

Int. Cl. C01b 17/08

U.S. Cl. 23—308 S 5 Claims



Sulfur is continuously extracted from sulfur-bearing ore, found or brought to the surface, by injecting said ore through a tubular conduit containing a downstream sulfur extraction section. After sulfur is extracted, the residual trailings are further coursed upstream through a second tubular conduit to an exit point.

3,615,264

HYDROTHERMAL METHOD OF GROWING ZINC OXIDE CRYSTALS

James W. Berry, and Archie J. Deutschman, Jr., both of Tucson, Ariz., assignors to Owens-Illinois, Inc.

Filed Dec. 21, 1967, Ser. No. 692,267

Int. Cl. C01g 9/02

U.S. Cl. 23—301 R 13 Claims

A method for inhibiting corrosion of the reaction vessel during the hydrothermal growth of zinc oxide crystals in an alkaline solution of KOH wherein the solution contains potassium phosphate as the corrosion inhibitor.

3,615,265

PROCESS FOR DRYING BROMINE

Rainer Gartner, Loderburg, Germany, assignor to Veb Kombinat Kali, Sondershausen, Germany

Filed Sept. 19, 1969, Ser. No. 859,459

Int. Cl. C01b 7/00; B01d 1/02, 1/22

U.S. Cl. 23—307 4 Claims

Bromine, kept at an elevated temperature, preferably at

about its boiling point, gradually loses water and may be obtained essentially dry without any drying agent. The process is also useful to remove chlorine.

3,615,266

SILICON CHALCOGENIDES

Paul C. Donohue, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 2, 1970, Ser. No. 15,888

Int. Cl. C01b *33/00*; **B01j** *17/00*; **C04b** *35/00*

U.S. Cl. 23—315 **11 Claims**

Binary, ternary and quaternary silicon chalcogenides of the formula $Si_mS_xSe_yTe_z$ wherein m is 9.3±0.3, $x+y+z=4$, x is 0 to 3.2, and y and z are 0 to 4, having a crystal structure of cubic symmetry when the chalcogen is Se or S/Se and a closely related crystal structure of pseudocubic symmetry when one of the chalcogens is Te. Process for the preparation of the above chalcogenides comprising heating for at least about 15 minutes at about 800° C. to 1,600° C. and at least about 30 to 65 kilobars pressure the elementary components, mono- and dichalcogenides of silicon, and the binary and ternary chalcogenides of this invention. The dichalcogenides of this invention are useful as semiconductors and in detecting heat and infrared radiation.

3,615,267

SEPARATION OF NEPTUNIUM FROM URANIUM HEXAFLUORIDE CONTAINING THE SAME

Waldo R. Golliher; Robert L. Harris, and Reynold A. LeDoux, all of Paducah, Ky., assignors to The United States of America as represented by the United States Atomic Energy Commission

Filed Mar. 11, 1969, Ser. No. 806,293

Int. Cl. C01g *43/06*

U.S. Cl. 23—337 **3 Claims**

This invention relates to a method of selectively removing neptunium values from a gaseous mixture containing neptunium hexafluoride and uranium hexafluoride by passing the mixture through a bed of pelletized cobaltous fluoride at a temperature in the range 220° F. to 440° F. to effect removal of neptunium by the cobaltous fluoride.

3,615,268

ISOLATION AND PURIFICATION OF AMERICIUM FROM OTHER *5f* AND *4f* ELEMENTS BY EXTRACTION CHROMATOGRAPHY

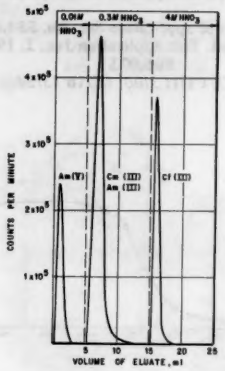
Fletcher L. Moore, Knoxville, Tenn., assignor to The United States of America as represented by the United States Atomic Energy Commission

Filed Nov. 29, 1968, Ser. No. 780,101

Int. Cl. C01g *56/00*

U.S. Cl. 23—338 **3 Claims**

A method for selectively removing americium values from an aqueous solution containing americium as well as other *5f* and/or *4f* elements which comprises selectively oxidizing the americium to the +5 oxidation state and then passing the resultant solution through a stationary phase or static bed of



an inert material having impregnated on its surface a diester of orthophosphoric acid such as di(2-ethylhexyl)phosphoric acid.

3,615,269

CERTAIN FLUORODIAZONIUM COMPOUNDS

Luke A. Schaap, South Holland; Alex Zletz, Chicago Heights, Ill., and Thomas D. Nevitt, Valparaiso, Ind., assignors to Standard Oil Company, Chicago, Ill.

Filed May 18, 1966, Ser. No. 551,086

Int. Cl. C01h *21/52*

U.S. Cl. 23—357 **3 Claims**

1. As a composition of matter, fluorodiazonium tetrafluoroborate.

2. As a composition of matter, fluorodiazonium hexafluorophosphate.

3,615,270

METAL BERYLLIUM HYDRIDES AND METHOD FOR PREPARING THE SAME

John A. Snover, Beverly Farms, Mass., assignor to Metal Hydrides Incorporated, Beverly, Mass.

Filed Aug. 20, 1962, Ser. No. 218,803

Int. Cl. C01b *6/24*

U.S. Cl. 23—360 **12 Claims**

1. The method for preparing metal beryllium hydrides conforming to the formula $M_2(BeH_4)_m$ where M is a metal selected from the group consisting of alkali metals and alkaline earth metals and m is the valence of the metal M, which comprises mixing an organo metal beryllium compound conforming to the formula $M(BeR_3)_m$ with a solution in an ether solvent of a compound conforming to the formula $M(AlH_4)_m$ thereby forming a liquor containing a compound conforming to the formula AlR_3 dissolved therein and a precipitated compound conforming to the formula $M_2(BeH_4B'm$, being selected from the group consisting of methyl, ethyl, propyl, isopropyl, secondary butyl, tertiary butyl, isobutyl, n-pentyl, n-butyl, n-hexyl, n-octyl, Stearyl, cyclopentyl, cyclohexyl, phenyl, 1,1-diphenylhexyl, 1-phenyl-2-butenyl, 1-phenyl-1-methylethyl, and 3--methyl-2-butenyl radicals.

3,615,271

PREPARATION OF TITANIUM CARBONITRIDE

John W. Dietz, Wilmington, Del., assignor to E.I. du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 28, 1970, Ser. No. 6,541

Int. Cl. C01b *21/06*

U.S. Cl. 23—359 **3 Claims**

A process for the production of finely divided titanium carbonitride is disclosed. Titanium tetrachloride is reacted with methylamine in an inert atmosphere to form a titanium chloride amine complex. The complex is then heated in an

atmosphere of ammonia or methylamine to about 600° C. over a period of several hours. The atmosphere is then changed to hydrogen or a mixture of hydrogen with argon, methane and/or ammonia, and the temperature is increased to 900° C. Finally, the atmosphere is changed to argon and the temperature is increased to 1,200° C. A high surface area carbonitride product is recovered upon cooling.

3,615,272

CONDENSED SOLUBLE HYDROGENSILSESQUIOXANE RESIN

Warde T. Collins, and Cecil L. Frye, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Nov. 4, 1968, Ser. No. 773,314
Int. Cl. C01b *33/04*
U.S. Cl. 23—366 9 Claims

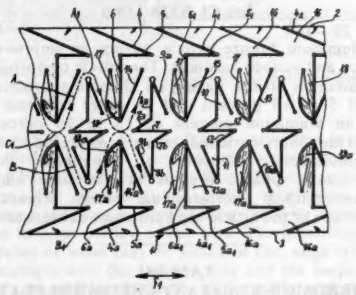
Hydrogensilsesquioxane, free of hydroxyl content, of the general formula $(HSiO3/2)_n$ where n is an even integer of 10 or more, is disclosed. The condensed hydrogensilsesquioxane is prepared by condensation of trichloro-, trimethoxy- or triacetoxysilanes in a sulfuric acid medium. A specific example is $(HSiO3/2)_n$ where n has an average value of 20 or more. This material is a resinous polymer which contains small amounts of volatile oligomers and is useful as a protective coating.

3,615,273

STRIP FOR OBTAINING A BARBED ELEMENT

Jacques Leon Alexandre See, Paris, France, assignor to Rador S. A., Luxembourg

Filed Sept. 12, 1969, Ser. No. 857,609
Claims priority, application Switzerland, Sept. 13, 1968, 13712/68
Int. Cl. B21c *37/02*
U.S. Cl. 29—190 6 Claims



Strip for obtaining a barbed member in which are made lateral cuts each consisting of an oblique first cut emerging on the lateral edge, a second cut, parallel to said lateral edge and communicating with the end of said first cut, and a third cut extending from the free end of this second cut to the vicinity of the longitudinal axis of the strip, said lateral cuts being combined with median cuts extending between two successive sets of lateral cuts, said median cuts each having a longitudinal portion from whose ends there extend two portions of cuts limiting appreciably triangular parts.

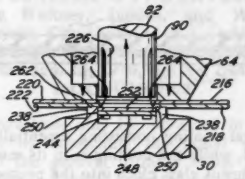
3,615,274

MATERIAL FASTENING MEANS

John Belada, Glassboro, N.J., assignor to A. R. Molino, Glassboro, N.J.

Division of Ser. No. 582,003, Sept. 26, 1966, Pat. No. 3,470,596.
Filed Jan. 31, 1969, Ser. No. 828,023
application Jan. 31, 1969, Ser. No. 828,023
Int. Cl. B23p *11/00*
U.S. Cl. 29—191 4 Claims

A fastening means and method for securing together two sheets of metallic material with one sheet positioned over the other by having a region encompassed by a plurality of disconnected lines defining the edges of the region, the region of the sheets and its edges being displaced with respect to the portion of the sheets surrounding the region and joined by one or more connecting strips. The portion of the sheets surrounding the region has an extruded edge



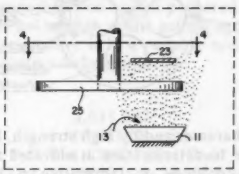
corresponding to each edge of the regions extending from the bottom surface portion surrounding the region over and beyond a corresponding displaced edge for securing together the sheets of material.

3,615,275

HOMOGENEOUSLY FINE-GRAINED VAPOR-DEPOSITED MATERIAL IN BULK FORM

Charles D. Turk, Norwood, and Harris L. Marcus, North Attleboro, both of Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 12, 1967, Ser. No. 689,944
Int. Cl. B32b *15/00*
U.S. Cl. 29—194 2 Claims



In one form of the invention a substrate in the condition and form of a hot titanium strip is advanced over a refractory mask in which are slots for admitting to a face of the strip the vapor of a crystalline material. Crucibles are arranged in a sequence beneath the mask to supply the vapor through the slots for deposition in very thin layers on the substrate.

In another batch form of the invention the substrate comprises a fixed substrate sheet located above a slotted rotating shutter. Below the shutter is a crucible containing the material to be vaporized and deposited in the very thin layers upon the substrate.

In both forms, the apparatus above described is located in a chamber which may be evacuated or contain a desired atmosphere. In each case the substrate is maintained at a temperature such that, as successive very thin layers of the vaporant are laid down, each condenses before the next is applied so that the latter will nucleate and condense without continuous columnar grain growth normal to the plane of the multiply material on the substrate. A number of layers are laid down until the material deposited on the substrate reaches a bulk thickness in the range of about 1 to 10 mils. The resulting homogeneously grained and layered composite is then stripped from the substrate.

3,615,276

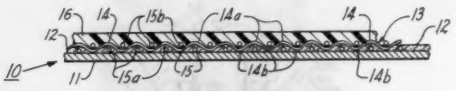
PROTECTED METAL ARTICLE

Fred G. Singleton, Pittsburgh, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Filed Feb. 3, 1969, Ser. No. 795,845
Int. Cl. B32b *15/14*
U.S. Cl. 29—195 5 Claims

A protected metal article consisting of a core of sheet steel coated sequentially with a protective metal consisting essentially of zinc; a fibrous glass cloth impressed into the

protective metal and a weather-resistant outer coating applied to the fibrous glass cloth. The fibrous glass cloth may comprise either a glass fiber thread woven fabric or a bonded mat formed from randomly oriented continuous glass fiber filaments. The article is prepared by applying a molten



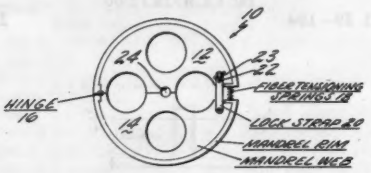
protective metal coating consisting essentially of zinc to a steel sheet and, while the coating is in its molten condition, impressing a fibrous glass cloth into the protective metal and fusing the protective metal whereby the fibrous glass cloth is partially embedded within the protective metal.

3,615,277

METHOD OF FABRICATING FIBER-REINFORCED ARTICLES AND PRODUCTS PRODUCED THEREBY

Kenneth G. Kreider, Glastonbury; Eugene J. Delgrosso, Wallingford, and Thomas J. Derby, Manchester, all of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed May 2, 1969, Ser. No. 821,378
Int. Cl. B23p *3/00*
U.S. Cl. 29—195 **2 Claims**



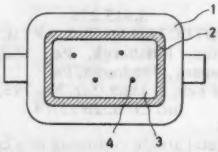
Filaments characterized by high strength, high rigidity, and high resistance to deterioration at elevated temperatures are utilized in a process of fabricating a multilayer fiber-reinforced metal matrix composite by winding a filament on a spring-loaded mandrel covered with brazing foil, preheating the mandrel, plasma arc spraying metal matrix material in coalescent form onto the filament windings so as to form a monolayer tape, and low pressure braze bonding a plurality of such tapes together in layers, the process being characterized by a high degree of reproducibility.

3,615,278

ENAMELING GRADE STEEL AND METHOD OF PRODUCING THE SAME

Zensaku Yamamoto; Susumu Sato; Shujiro Ono; Hiroshi Horiguchi, Muroran, Hokkaido; Shozo Ariga, Setagaya-ku, Tokyo; Shogo Takaishi, Suginami-ku, Tokyo, and Hiroshi Sato, Suginami-ku, Tokyo, all of Japan, assignors to Nippon Steel Corporation, Chiyoda-ku, Tokyo, Japan

Continuation of application Ser. No. 417,009, Dec. 9, 1964, now abandoned. This application Mar. 19, 1969, Ser. No. 814,499
Claim priority, applications Japan, Dec. 14, 1963, Dec. 14, 1963, Dec. 14, 1963, Dec. 14, 1963, Sept. 4, 1964; 38/67288, 38/67289, 38/67290, 38/67291; 39/50761.
Int. Cl. B32b *15/00*
U.S. Cl. 29—196.1 **3 Claims**



Enameling grade steel ingots or sheets made therefrom, the ingots having a relatively thin outer rimmed layer and a thicker core, the latter being enriched by an alloying metal or metals, especially consisting of Cr, Mn, Al, V, and Ti, which are capable of preventing carbon migration toward the surface or capable of gathering the carbon precipitating in the outer layer toward the core portion during heat treatment or enamel firing above the A_1 transformation point. Also disclosed is a method of making the ingots.

3,615,279

METAL COMPOSITE HAVING AN ALUMINUM ALLOY LAYER BONDED TO A TITANIUM ALLOY LAYER

Bennie Ray Ward, Jr., Chesterfield County, Va., assignor to Reynolds Metals Company, Richmond, Va.

Division of Ser. No. 497,554, Oct. 18, 1965, Pat. No. 3,359,142. Filed Dec. 4, 1967, Ser. No. 720,421
application Dec. 4, 1967, Ser. No. 720,421
Int. Cl. B32b *15/00*
U.S. Cl. 29—197 **8 Claims**

There is disclosed a high-strength metal composite made of at least one layer of heat-treatable aluminous metal bonded to a layer of titanium alloy which is susceptible to strengthening by heating in the temperature range for solution treatment of the aluminous metal. Thus, one heat treatment may be used to simultaneously solution heat-treat the aluminous metal and age the titanium alloy. Specific examples discussed include four types of composites of 2024 and 7075 aluminum alloys with Ti–6Al–4V and Ti–4Al–3 Mo–1V titanium alloys.

3,615,280

ALUMINUM BRONZE ARTICLE HAVING A HARDENED SURFACE

Quentin F. Ingerson, Milwaukee, Wis., assignor to Ampco Metal, Inc., Milwaukee, Wis.

Division of Ser. No. 589,802, Oct. 27, 1966, Pat. No. 3,505,104. Filed Feb. 10, 1970, Ser. No. 10,288
1970, Ser. No. 010,288
Int. Cl. B32b *15/00*
U.S. Cl. 29—199 **4 Claims**

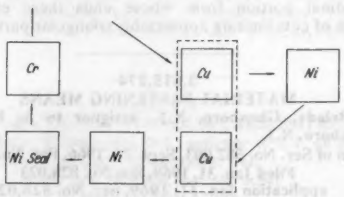
An aluminum bronze article having an improved wear resistance and surface hardness. The article comprises a base alloy aluminum bronze having an aluminum content in the range of 5 to 13 percent and an outer coherent surface having an aluminum content of 13 to 16 percent. The coherent aluminum-enriched surface is produced by diffusion and simultaneous alloying of aluminum into the microstructural phases present in the base alloy. The aluminum-enriched microstructure phases present at the outer surface of the article are hard and wear resistant.

3,615,281

CORROSION-RESISTANT CHROMIUM-PLATED ARTICLES

Peter J. Ramsden, Surrey, England, assignor to Electro Chemical Engineering Company Limited, Surrey, England

Filed Apr. 26, 1968, Ser. No. 724,340
Claims priority, application Great Britain, Apr. 26, 1967, 19173/67
Int. Cl. B32b *15/00*
U.S. Cl. 29—199 **7 Claims**



In plated articles comprising a series of nickel or nickel alloy layers on a substrate, with or without a basal layer of copper or a copper alloy, and having as surface either a nickel-seal followed by a chromium layer, or a microcracked chromium layer, an intermediate copper or copper alloy

layer is provided below the nickel or nickel alloy layer immediately below the nickel-seal or microcracked chromium layer; this is found to cause an unexpectedly great increase in resistance to corrosion.

3,615,282

HIGH-STRENGTH FUSION WELDS IN BETA COPPER-ALUMINUM ALLOYS

George H. Eichelman, Jr., Cheshire, and Michael J. Pryor, Woodbridge, both of Conn., assignors to Olin Corporation

Filed Feb. 5, 1969, Ser. No. 796,921
Int. Cl. B23p 3/00
U.S. Cl. 29—199 7 Claims

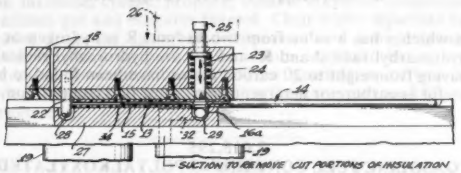
A process for providing a high strength weldment by welding together two alloy members which contain 9.0 to 11.8 percent aluminum and a substituent selected from the group consisting of 2.0 to 5.0 percent iron, 0.4 to 2.0 percent chromium, 0.05 to 0.2 percent zirconium, 0.5 to 1.2 percent cobalt, 0.2 to 2.0 percent manganese, welding together the alloy members with a welding filler alloy of like composition, cooling the welding surface at a rate greater than 300° F. per minute, and the article produced thereby.

3,615,283

METHOD OF FORMING CONDUCTOR WITH SPACED TERMINAL LOOPS

Donald D. Lang, Garden Grove, Calif., assignor to Spectra-Strip Corporation, Garden Grove, Calif.

Filed Sept. 19, 1969, Ser. No. 859,258
Int. Cl. H01b 7/08, 13/00
U.S. Cl. 29—624 7 Claims



A conductor with a loose-fitting insulating jacket and having terminal loops pressed therefrom through its insulation by a punch operating from the side opposite the protrusion. The wire is pulled bodily relative to its own insulation as the loop is formed to avoid wire drawing and reduction in cross section of the wire. The insulating jackets of a plurality of wires may be joined in flat, edge relation to form a multiple-wire flat ribbon cable and the loops formed in groups repeated longitudinally of the cable, with the loops in each group extending upwardly at right angles to the plane of the cable and longitudinally and transversely spaced in a staggered pattern. The immediately preceding loop in a wire or cable is used as an anchoring point in the pressing out of a new spaced loop so that the wire is bodily slid within its insulating jacket from the direction in which the newly formed loop is offset from the previously formed loop.

3,615,284

FUEL COMPOSITION

Richard D. Cassar, West Chester, Pa., assignor to Sun Oil Company, Philadelphia, Pa.

Filed July 9, 1969, Ser. No. 840,532
Int. Cl. C10l
U.S. Cl. 44—1 R 4 Claims

An improved solid fuel composition comprises 65 to 98.8 weight percent paraffin wax, 1.1 to 25 weight percent of ultrahigh molecular weight polyethylene, and 0.1 to 10 weight percent of palygorskite particles, the latter two uniformly distributed throughout the wax, is useful for supplying heat to protect living plants susceptible to injury low ambient air temperature. The ultrahigh molecular weight polyethylene refers to a polyethylene with a weight average molecular weight in the range of 500,000 to 6,000,000. The clay particles in this composition have the function of keeping the polyethylene uniformly distributed throughout the composition. In addition the particles reduce dripping during combustion and reduce the amount of unburnt hydrocarbon residue.

3,615,285

HYDROCARBONS GELLED WITH ALKOXY COMPOUNDS CONTAINING TWO DIFFERENT METALS

Thomas Allen Whitney, Linden, and William Joseph Mykytka, Jersey City, both of N.J., assignors to Esso Research and Engineering Company

Filed Jan. 30, 1970, Ser. No. 7,247
Int. Cl. C10l 7/02
U.S. Cl. 44—7 18 Claims

Liquid hydrocarbons may be increased in viscosity to a desired degree by combining the liquid with a gelling composition of the general formula MOR and $M'(OR')_3$ where M is a Group I metal and M' is a group III metal. R and R' are independently selected from C_1 to C_{25} hydrocarbyl radicals.

3,615,286

SOLID FIRE LIGHTING FUEL AND PROCESS OF PREPARATION

Ronald C. Vander Linden, Sarnia, Ontario, Canada, assignor to Esso Research and Engineering Company

Filed Apr. 10, 1968, Ser. No. 720,373
Int. Cl. C10l 7/02
U.S. Cl. 44—7 D 11 Claims

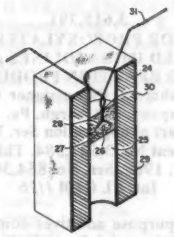
A solid fuel briquet, useful for igniting wood in a fireplace or for igniting charcoal or charcoal briquets in outdoor barbecue apparatus and the like comprises a major proportion of a liquid hydrocarbon fuel such as a petroleum distillate fuel, and a minor solidifying proportion of a urea-formaldehyde resin. To prepare the fuel composition, a mixture of a urea-formaldehyde resin syrup and an aqueous emulsion of hydrocarbon fuel is first prepared, and the resin syrup is caused to gel with an acidic gelling agent. By causing gelation while the mixture is in a suitable mold a briquet of desired size and shape can be produced.

3,615,287

IGNITER

Favian M. Adair, P.O. Box 4206, Tyler, Tex.

Filed Oct. 31, 1969, Ser. No. 872,985
Int. Cl. A01g 13/06; F23q 21/00
U.S. Cl. 44—36 3 Claims



An igniter has an electric filament and lead wires connected to the filament which are insulated but in intimate contact, the insulation being flammable and on burning of the insulation the wires short circuit, and a block of combustible material surrounding the filament and in contact with the insulation so as to ignite the insulation when the filament is energized.

3,615,288

THERMALLY STABLE JET FUEL COMPOSITION

William M. Sweeney, Wappingers Falls; Kenneth L. Dille, Wappingers Falls, and Jerzy J. Bialy, Lagrangeville, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Mar. 17, 1969, Ser. No. 807,942
Int. Cl. C10l 1/16, 1/18, 1/22
U.S. Cl. 44—62 10 Claims

Thermally stable turbine or jet fuel composition containing in combination an ethylene-propylene-diene

terpolymer/maleic anhydride reaction product and an aldehyde-amine condensation product and a method of operating a turbine engine on said fuel composition.

3,615,289
CANDLE COMPOSITION
Robert L. Felton, Clifton, N.J., assignor to Avon Products, Inc., New York, N.Y.
Filed Mar. 26, 1969, Ser. No. 810,817
Int. Cl. C10l *5/00*
U.S. Cl. 44—7.5 **8 Claims**

Candle compositions which may be transparent or pastel shaded and which are adapted to incorporate perfumes without flashing during burning, such compositions comprising as the basic components a mixture of (a) a thermoplastic polyamide resin formed from linoleic acid polymerized with a polyamine compound, (b) an alkanol amide or alkanol amine and (c) a stearic acid compound.

3,615,290
EMULSIFIED HYDROCARBON FUEL
James Nixon, Westfield, N.J., assignor to Esso Research and Engineering Company
Filed Apr. 3, 1969, Ser. No. 813,271
Int. Cl. C10l *1/32*
U.S. Cl. 44—51 **6 Claims**

Stable emulsions of normal liquid hydrocarbon fuels particularly jet gas turbine fuels for aircraft are prepared in which the normally liquid hydrocarbon fuel is emulsified with a minor amount of a polar organic liquid which is immiscible with said normally liquid hydrocarbon fuel. The emulsion of the hydrocarbon fuel is at least 75 wt. percent of the fuel as a dispersed phase, contains at least one nonionic emulsifier, contains a polar organic solvent as the continuous phase and also contains up to and including about 1.5 wt. percent of water. In addition, this emulsion also contains a small amount (from 0.001 up to 1.0 wt. percent of the emulsion of a corrosion inhibitor selected from the group consisting of the alkali metal, alkaline earth metal, ammonium, or hydrazine soaps of normal or branched chain C_4–C_{30} alkyl or alkenyl substituted succinic anhydride or succinic acid, the Schiff's bases of hydroxy phenyl aldehydes, oximes, ketones or the hydroxy benzyl aldehydes, oximes or ketones condensed with an alkylene diamine or polyamine, and the aziridyl substituted alkyl amines, diamines, or polyamines.

3,615,291
ETHOXYLATED OR PROPOXYLATED 1,2,4- OR 1,2,5-TRISUBSTITUTED IMIDAZOLINES AND LECITHIN MIXTURES AND REACTION PRODUCTS THEREOF
Helen I. Thayer, Oakmont, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.
Continuation-in-part of application Ser. No. 544,839, Apr. 25, 1966, now Patent No. 3,527,584. This application Aug. 29, 1969, Ser. No. 854,301
Int. Cl. C10l *1/26*
U.S. Cl. 44—58 **2 Claims**

Motor fuel multipurpose additives comprising ethoxylated or propoxylated 1,2,4- or 1,2,5-trisubstituted imidazolines or the mixtures of lecithin with said imidazolines.

3,615,292
SMOKE SUPPRESSANT COMPOSITIONS FOR PETROLEUM FUELS
Elmer J. Badin, Hightstown, N.J., assignor to Cities Service Oil Company, Tulsa, Okla.
Continuation-in-part of application Ser. No. 694,819, Jan. 2, 1968. This application Nov. 26, 1968, Ser. No. 779,220
Int. Cl. C10l *1/18, 1/30*
U.S. Cl. 44—66 **15 Claims**

The invention disclosed herein is a smoke suppressant additive comprising an ether, a Group IIA metal carboxylate and a Group IIB metal carboxylate. A preferred fuel additive is a mixture of an alkyl ether of ethylene glycol and barium and zinc alkanoates wherein the weight ratio of ether to total carboxylates if from about 4:1 to 1:1. A further improved additive is obtained when a Group IIA metal sulfonate, especially a barium alkaryl sulfonate, is incorporated into the carboxylates-ether additive mix. An additive mixture having a ratio of about 1 to 2 parts ether and 1 to 2 parts of barium alkaryl sulfonate per part barium and zinc alkanoates, is particularly suitable.

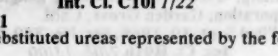
3,615,293
SPARK PLUG ANTI-FOULANT
Vincent F. Hnizda, Huntington Woods, Mich., assignor to Ethyl Corporation, New York, N.Y.
Filed Dec. 20, 1968, Ser. No. 785,801
Int. Cl. C10l *1/18, 1/30*
U.S. Cl. 44—66 **21 Claims**

A method of reducing spark plug fouling in spark ignition engines fueled with organomanganese containing gasoline is described. The method features the use in gasoline of a spark plug antifouling amount of an organic molybdenum compound.

Molybdenum naphthenate is an example of a useful antifoulant compound.

3,615,294
DETERGENT MOTOR FUEL CONTAINING SUBSTITUTED UREAS
Ronald W. Von Allmen, Hopewell Junction, N.Y., assignor to Texaco Inc., New York, N.Y.
Filed Mar. 26, 1970, Ser. No. 23,027
Int. Cl. C10l *1/22*
U.S. Cl. 44—71 **7 Claims**

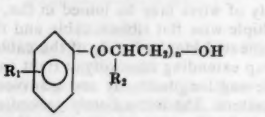
A class of substituted ureas represented by the formula:



in which x has a value from two to four, R is hydrogen or a hydrocarbyl radical and R′ and R″ are hydrocarbyl radicals having from eight to 20 carbon atoms have been found to be useful as carburetor detergents in a motor fuel composition.

3,615,295
GASOLINE FUEL CONTAINING POLYALKOXYLATED ALKYLPHENOL TO REDUCE EXHAUST EMISSION
Otto J. Manary, Jr., Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.
Filed July 18, 1969, Ser. No. 843,235
Int. Cl. C10l *1/18*
U.S. Cl. 44—78 **7 Claims**

By using a fuel composition containing a small but effective amount of a polyalkoxylated alkylphenol of the general formula

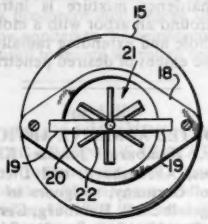


wherein:
R_1 = an alkyl of 4 to 12 carbon atoms
n = an integer from 2 to 15
R_2 = independently for each of the n units H or methyl
the hydrocarbon emission in the exhaust from an internal combustion engine is reduced.

3,615,296
MEANS FOR ENHANCING COMBUSTION EFFICIENCY IN INTERNAL COMBUSTION ENGINES
Vincent Guarnaschelli, Greenlawn, N.Y., assignor to The Nycal Company, Inc., Carlstadt, N.J.
Filed Nov. 14, 1969, Ser. No. 876,755
Int. Cl. B01f *3/02*; F02m *17/00*
U.S. Cl. 48—180 R **15 Claims**

A bladed wheel, fan, turbine or the like is mounted in or below the downdraft side of the carburetor and has an even number of equidistantly spaced blades alternate ones of which are tilted at a relatively large angle to the axis of the turbine to cause rotation of the turbine by the fuel intake suction while the remaining blades each of which is positioned between two propulsion blades have any angle of tilt with respect to the tilt angle of the propulsion blades such

that said remaining blades resist and slow down the speed of rotation of the turbine while causing more thorough mixing



of the fuel and air mixture, consequent to increased vaporization of the fuel.

3,615,297

CARBON RECOVERY PROCESS

Roger M. Dille, Richmond, Va.; Warren G. Schlinger, Pasadena, and Joseph P. Tassoney, Whittier, Calif., assignors to Texaco Inc., New York, N.Y.

Filed June 16, 1970, Ser. No. 46,804
Int. Cl. C10j *3/84*; C10k *1/00, 1/08*
U.S. Cl. 48—196 R 7 Claims

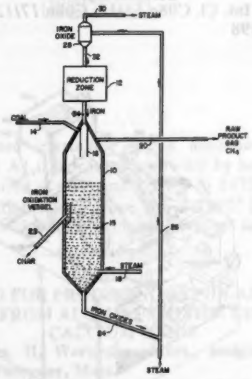
A method for recovering oil-free particulate carbon from synthesis gas by washing said synthesis gas free from particulate carbon with water, preferably maintained at a pH in the range of about 7.5 to 10. A dispersion of particulate carbon in water is formed which is then contacted with bubbles of a gas selected from the group consisting of natural gas, methane, ethane, propane, butane, ethylene, propylene, synthesis gas and mixtures thereof. Clear water separates by gravity from the gas treated dispersion and a supernatant flowable slurry of particulate carbon in water having an increased concentration of oil-free particulate carbon is formed which may be recycled to the generator as fuel, or dewatered.

3,615,298

GASIFICATION OF CARBONACEOUS MATERIAL

Homer E. Benson, Pittsburgh, Pa., assignor to Consolidation Coal Company

Continuation-in-part of application Ser. No. 598,072, Nov. 30, 1966, now abandoned, Continuation-in-part of application Ser. No. 816,000, Apr. 14, 1969, now Patent No. 3,503,724. This application Dec. 16, 1969, Ser. No. 885,600
Int. Cl. C01b *1/08*; C07c *9/04*; C10j *3/46*
U.S. Cl. 48—197 5 Claims



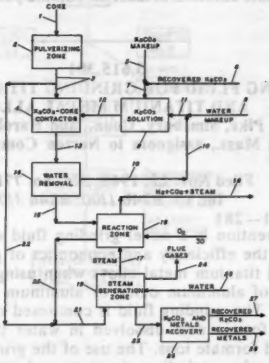
The reaction of steam with iron, or lower iron oxides, is conducted in the presence of carbonaceous solids by circulating the steam upwardly in countercurrent flow relationship with downwardly moving iron or lower iron oxides in a fluidized bed of the carbonaceous solids.

3,615,299

HYDROGEN PRODUCTION BY REACTION OF CARBON WITH STEAM OR STEAM AND OXYGEN

Paul E. Fischer, Lafayette, and Melvin M. Holm, Alameda, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed June 4, 1969, Ser. No. 830,469
Int. Cl. C10j *3/16*
U.S. Cl. 48—204 8 Claims



Process for producing a hydrogen-rich gas mixture which is lean in CO and CH_4 relative to CO_2 by:

a. contacting subdivided carbonaceous matter with steam and oxygen in a reaction zone at temperatures between about 800° and 1,350° F. to form H_2 and CO_2,

b. feeding sufficient steam to the reaction zone so that the hydrogen-rich gas mixture which is withdrawn from the reaction zone contains at least 60 volume percent steam, and

c. withdrawing the hydrogen-rich gas mixture from the reaction zone at a temperature between 800° and 1,250° F.

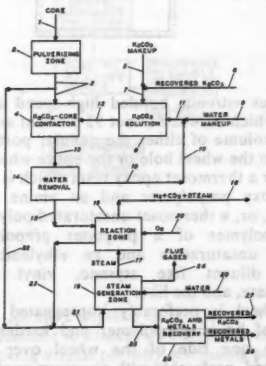
The ratio of CO_2 to CO and CO_2 to CH_4 in the hydrogen-rich gas withdrawn from the reaction zone is maintained above 2.5. According to a preferred embodiment only steam is used as an oxidizing source in the reaction zone.

3,615,300

HYDROGEN PRODUCTION BY REACTION OF CARBON WITH STEAM AND OXYGEN

Melvin M. Holm, Alameda, and Paul E. Fischer, Lafayette, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed June 4, 1969, Ser. No. 830,468
Int. Cl. C10j *3/16*
U.S. Cl. 48—206 6 Claims



A process for producing a hydrogen-rich gas mixture which is lean in CO and CH_4 relative to CO_2 which

comprises:

a. contacting subdivided carbonaceous matter with steam and oxygen in a reaction zone at temperatures between about 800° F. and 1,350° F. to form H_2 and CO_2,

b. maintaining the temperatures in the reaction zone within 100° F. of the average temperature for the reaction zone,

c. withdrawing the hydrogen-rich gas mixture from the reaction zone, and

d. feeding sufficient steam to the reaction zone so that the hydrogen-rich gas mixture which is withdrawn from the reaction zone contains at least 60 volume percent steam.

3,615,301

GRINDING FLUID FOR GRINDING TITANIUM METAL AND TITANIUM METAL ALLOYS

Roscoe A. Pike, Simsbury, Conn., and Harold O. Strandberg, Holden, Mass., assignors to Norton Company, Worcester, Mass.

Filed Nov. 22, 1968, Ser. No. 778,296

Int. Cl. B24b *1/00*; B24d *3/02*

U.S. Cl. 51—281 **5 Claims**

The invention is a novel grinding fluid or coolant which improves the efficiency and economics of grinding titanium metal and titanium metal alloys when using grinding wheels made up of aluminum oxide or aluminum oxide containing abrasives. The grinding fluid is composed of salts of nitrous acid and formic acid dissolved in water thereby providing nitrite and formate ions. The use of the grinding fluid of this invention when grinding titanium and its alloys, in such precision grinding applications as surface grinding results in higher metal removal to wheel wear ratios and also results in more rapid removal of metal by permitting the use of higher infeeds than have been permissible with prior art grinding fluids.

3,615,302

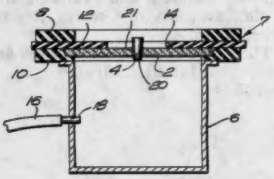
THERMOSET-RESIN IMPREGNATED HIGH-SPEED VITREOUS GRINDING WHEEL

Robert A. Rowse, Shrewsbury, and Roy S. Nelson, Sterling, both of Mass., assignors to Norton Company, Worcester, Mass.

Continuation-in-part of application Ser. No. 634,622, Apr. 28, 1967, now abandoned. This application June 18, 1970, Ser. No. 47,581

Int. Cl. B24d *5/02*; C08g *17/14*

U.S. Cl. 51—295 **6 Claims**



A porous vitreous bonded high-speed abrasive grinding wheel in which between about 95 percent and 100 percent of the pore volume of either the annular portion of the wheel adjacent to the wheel hole or the entire wheel is impregnated with either a thermoset epoxy resin which is a copolymer of a liquid epoxy prepolymer and an amine or organic acid anhydride, or, a thermoset unsaturated polyester resin which is a copolymer of a polyester prepolymer containing ethylenic unsaturation and an ethylenically unsaturated reactive diluent like styrene, vinyl acetate, methyl methacrylate, and the like.

The wheel is preferably impregnated by applying the mixture of liquid prepolymer and hardener (cross-linking agent) to one side of the wheel over the area to be impregnated, preferably with a vacuum applied to one side of the wheel to draw the liquid prepolymer-hardener mixture into the pores of the wheel. Copolymerization (cross-linking) of the prepolymer-hardener mixture occurs in situ in the pores.

The cross-linked epoxy or unsaturated polyester resin may form an internal bushing of solid resin with substantial radial impregnation into the wheel. In such cases, the prepolymer-hardener mixture is introduced into the wheel hole around an arbor with a mold plate over both sides of the hole and extending radially along the wheel surfaces to the extent of desired penetration.

3,615,303

COATED ABRASIVE ARTICLE

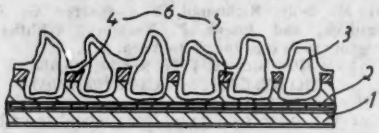
Hermann Singer, Hamburg; Johann Kuhr, Harksheide; Hermann Delius, Ahrensburg, and Dietmar Wunderlich, Hamburg, all of Germany, assignors to Reichhold-Albert-Chemie Aktiengesellschaft, Hamburg, Germany

Filed Oct. 18, 1968, Ser. No. 768,828

Claims priority, application Switzerland, May 31, 1968, 8411/68; Germany Oct. 25, 1967, R36214; R36215; R36217; R47216; R47217; R47218

Int. Cl. B24b *1/00*; C08g *51/12*

U.S. Cl. 51—295 **12 Claims**



An improvement in coated abrasive articles for wet or dry grinding comprising a finished fabric support, an elastic impermeable intermediate layer, a layer of abrasive particles and a resin binder for the abrasive particles, wherein the intermediate layer is a cured mixture comprising:

a. epoxide resin based on 4,4'-dihydroxy-diphenyl-2,2-propane, subsequently called Bisphenol A;

b. an epoxide resin based on Bisphenol A internally plasticized by reaction with castor oil;

c. carbamic acid alkyl esters; and

d. curing agents.

3,615,304

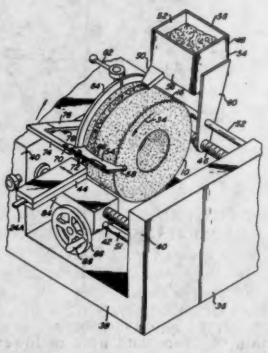
METHOD OF MANUFACTURING A FIBROUS REINFORCED GRINDING WHEEL

Richard T. Caserta, Lansdale, Pa., and James C. Rine, North Tonawanda, N.Y., assignors to Red Hill Grinding Wheel Corporation

Continuation-in-part of application Ser. No. 806,642, Mar. 12, 1969, now abandoned. This application May 25, 1970, Ser. No. 40,175

Int. Cl. C08g *51/12*; C08h *17/12*

U.S. Cl. 51—298 **7 Claims**



A grinding wheel and method of manufacture wherein the circumferential surface of a grinding wheel having a satisfactory thickness is reinforced by the application of one

or more turns of a continuous, untwisted, reinforcing filament, preferably glass fiber. The circumferential surface is first precoated with a resin, and then the reinforcing filament is applied under a predetermined degree of tension. A final coat of resin is then applied to the reinforcing filaments, with a squeegee being used to insure thorough resin penetration.

3,615,305

DENTAL AMALGAM POLISHING COMPOSITION COMPRISING STANNOUS SILICATE $SnSiO_3$

Joseph C. Muhler, Indianapolis, Ind., assignor to Indiana University Foundation, Bloomington, Ind.

Filed Jan. 12, 1970, Ser. No. 2,359
Int. Cl. B24d *3/02*; B24b *1/00*
U.S. Cl. 51—308 **6 Claims**

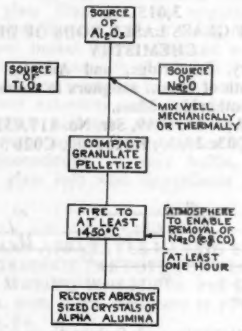
Polishing compositions comprising stannous silicate, $SnSiO_3$, having particles laying in the range of up to about 90 microns as an essential active ingredient are useful in polishing amalgam restorations, especially silver amalgam restorations.

3,615,306

A METHOD FOR PRODUCING ALPHA-ALUMINA CRYSTALS FROM ALUMINUM OXIDE

Cecil M. Jones, II, Worcester, and John J. Amero, Shrewsbury, both of Mass., assignors to Norton Company, Worcester, Mass.

Filed Oct. 12, 1976, Ser. No. 674,935
Int. Cl. C09c *1/68*; B24d *3/02*
U.S. Cl. 51—309 **11 Claims**


SOURCE OF Al_2O_3
SOURCE OF TiO_2
SOURCE OF Na_2O
MIX WELL MECHANICALLY OR THERMALLY
COMPACT GRANULATE PELLETIZE
FIRE TO AT LEAST 1450°C
ATMOSPHERE TO ENABLE REMOVAL OF Na_2O (& CO)
AT LEAST ONE HOUR
RECOVER ABRASIVE SIZED CRYSTALS OF ALPHA ALUMINA

Abrasive sized crystalline alpha alumina crystals are produced from Al_2O_3 containing powder by heating alumina source with source of soda and Titania to 1475° to 1700° C., with crystallization taking place above 1475° C. in presence of atmosphere which is reducing with respect to soda.

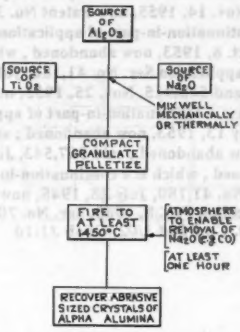
3,615,307

METHOD FOR PRODUCING ALPHA-ALUMINA CRYSTALS FROM ALUMINUM OXIDE CONTAINING CALCIUM OXIDE

Cecil M. Jones, II, Worcester, Mass., assignor to Norton Company, Worcester, Mass.

Filed Oct. 19, 1967, Ser. No. 676,552
Int. Cl. C09c *1/68*; B24d *3/02*
U.S. Cl. 51—309 **3 Claims**

Abrasive sized crystalline alpha alumina crystals are produced from Al_2O_3 containing powder by heating alumina source with source of soda and Titania to 1475 to 1700° C., with crystallization taking place above 1475° C. in presence of atmosphere which is reducing with respect to soda. The addition of combined calcium to the mix, in the amount of at least 0.5 percent by weight calculated as CaO, produces larger sized crystals.

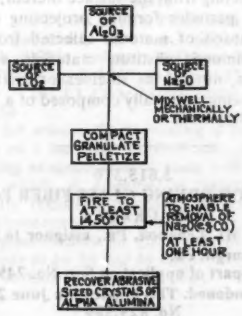

SOURCE OF Al_2O_3
SOURCE OF TiO_2
SOURCE OF Na_2O
MIX WELL MECHANICALLY OR THERMALLY
COMPACT GRANULATE PELLETIZE
FIRE TO AT LEAST 1450°C
ATMOSPHERE TO ENABLE REMOVAL OF Na_2O (& CO)
AT LEAST ONE HOUR
RECOVER ABRASIVE SIZED CRYSTALS OF ALPHA ALUMINA

3,615,308

CRYSTALLINE ABRASIVE ALUMINA

John J. Amero, Shrewsbury, Mass., assignor to Norton Company, Worcester, Mass.

Continuation-in-part of application Ser. No. 541,115, Apr. 8, 1966, now abandoned. This application Feb. 9, 1968, Ser. No. 704,304
Int. Cl. C04b *31/16*
U.S. Cl. 51—309 **1 Claim**


SOURCE OF Al_2O_3
SOURCE OF TiO_2
SOURCE OF Na_2O
MIX WELL MECHANICALLY OR THERMALLY
COMPACT GRANULATE PELLETIZE
FIRE TO AT LEAST 1450°C
ATMOSPHERE TO ENABLE REMOVAL OF Na_2O (& CO)
AT LEAST ONE HOUR
RECOVER ABRASIVE SIZED CRYSTALS OF ALPHA ALUMINA

Alpha-alumina abrasive crystals in the form of polygonal plates having a diameter to htickness ratio(*a* axis to *c* axis) of at least 2 to 1, having a total porosity, excluding pores larger than 50 microns, of at least 8 percent, having a hardness on the face perpendicular to the crystallographic *c* axis of about 1,600 on the Knoop (K_{100}) scale, and having particular utility for precision grinding and coated abrasive applications.

3,615,309

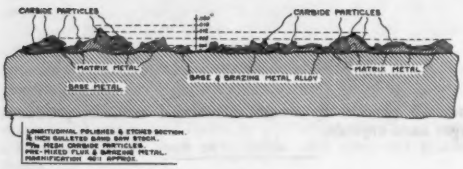
ARMORED METAL TOOLS

Chester H. Dawson, Danbury, Conn., assignor to Remington Arms Company, Inc., Bridgeport, Conn.

Continuation-in-part of application Ser. No. 638,998, May 16, 1967, now Patent No. 3,449,146, which is a continuation-in-part of application Ser. No. 177,558, Mar. 5, 1962, now abandoned, which is a continuation-in-part of application Ser. No. 546,779, Nov. 14, 1955, now Patent No. 3,024,128, which is a continuation-in-part of application Ser. No. 379,100, Oct. 8, 1953, now abandoned, which is a continuation of application Ser. No. 41,180, July 28, 1948, now abandoned, and 548,915, Nov. 25, 1955, now Patent No. 3,023,490, which is a continuation-in-part of application Ser. No. 367,543, July 13, 1953, now abandoned; said 177,558, Mar. 5, 1962, now abandoned; said 367,543, July 13, 1953, now abandoned, which is a continuation-in-part of application Ser. No. 41,180, July 28, 1948, now abandoned. This application Feb. 8, 1968, Ser. No. 704,170

Int. Cl. B24d *3/02*; C04b *31/16*

U.S. Cl. 51—309 18 Claims



Armored metal tools having a hard wearing, ductile, abrasive coating produced in situ from powdered matrix metal particles and abrasive particles of hard, high melting material, said tools comprising a structural base composed of a base metal, at least a portion of the surface of which is covered with a relatively thin, adherent and homogeneous layer of substantially uniform thickness, of said metal powders fusion bonded to each other and to said base metal and alloyed with said base metal throughout an interlayer between said base metal and coating layer, said coating layer of said fusion bonded metal powders having embedded therein and projecting from the surface thereof, a multiplicity of said abrasive particles forming projecting cutting edges and being composed of material selected from the group consisting of diamond substitute materials, such as metal carbides, borides, nitrides or silicides or mixtures thereof, said base metal being optionally composed of a heat treatable ferritic steel or alloy steel.

3,615,310

METHOD FOR DRYING GLASS FIBER FORMING PACKAGES

David M. Long, Mt. Lebanon, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of application Ser. No. 749,847, Aug. 2, 1968, now abandoned. This application June 2, 1969, Ser. No. 829,289

Int. Cl. C03b *37/00*

U.S. Cl. 65—2 12 Claims

Glass fiber strand forming packages are dried in a heated chamber at subatmospheric pressure in order to condition the strand for subsequent fabrication into roving and yarn. The temperature employed is above freezing temperature but below the temperature at which harmful changes to the forming size on the strand occurs. The time for conditioning is substantially reduced and the tendency for the size to migrate is substantially reduced. The moisture content on the strand in a plurality of forming packages is reduced to a uniform low percentage from package to package as well as throughout each package.

3,615,311

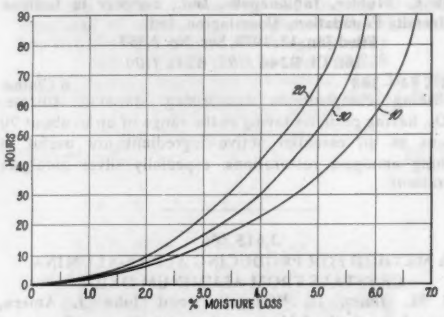
STARCH COATED FIBERS HAVING IMPROVED DRYING CHARACTERISTICS

Richard H. Ignatius, Aiken, S.C., assignor to Owens-Corning Fiberglas Corporation

Continuation-in-part of application Ser. No. 610,488, Jan. 20, 1967, now abandoned. This application Nov. 12, 1969, Ser. No. 875,842

Int. Cl. C03c *25/02*; C08b *25/02*

U.S. Cl. 65—3 9 Claims



A starch size composition for coating glass fibers at forming which has greatly improved drying properties. The composition includes a relatively narrow range of a noncrosslinked cationic starch and an underivatized starch that is preferably high in amylose and a portion of the granules of which are incompletely burst.

3,615,312

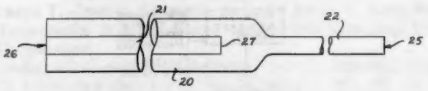
END FUSION OF GLASS LASER RODS OF DISSIMILAR CHEMISTRY

Robert J. Landry, Sturbridge, and Amadee D. Marino, Southbridge, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Apr. 21, 1969, Ser. No. 817,832

Int. Cl. C03c *23/20*; H01s *3/00*; C02b *5/14*

U.S. Cl. 65—4 9 Claims



Method of operatively end fusing dissimilar rare earth oxide doped laser glass into an operatively unitary laser device, and product of the method.

3,615,313

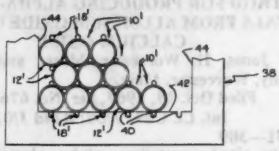
METHOD OF MAKING OPTICAL FIBERS, IMAGE-TRANSFER DEVICES

Roland A. Phaneuf, Sturbridge, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Filed June 9, 1969, Ser. No. 831,523

Int. Cl. C03b *23/20*

U.S. Cl. 65—4 3 Claims



Optical fibers each having a light-conducting main body section of circular cross-sectional configuration and a pair of

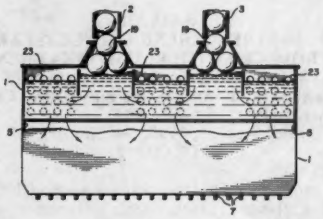
elongated, relatively thin light-absorbing filaments extending along and fused to the main body section, one at each of diametrically opposite sides thereof. Image-transfer devices comprised of a multiplicity of lengths of the fibers are formed by juxtapositioning such lengths with diameters thereof which correspond to the diametral positions of light-absorbing filaments on respective main body sections disposed parallel to each other throughout the assembly and with said light-absorbing filaments disposed in spaces between said main body sections.

3,615,314

APPARATUS FOR PRODUCING FILAMENTS OF GLASS

William P. Cunningham, Mt. Juliet, Tenn., and Tack J. Whang, Berea, Ohio, assignors to Ferro Corporation, Cleveland, Ohio

Filed Apr. 17, 1969, Ser. No. 817,038
Int. Cl. C03b *37/02*
U.S. Cl. 65—11 W **8 Claims**



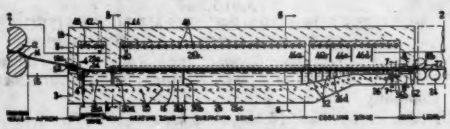
Method and apparatus for holding molten glass, and for producing glass filaments, the apparatus comprising a bushing having filament orifices along its lower portion, a trough-shaped basket means disposed within said bushing and extending substantially the length thereof, said basket means divided into segments by transverse baffles truncated at their lower extremity, said segments characterized by being alternately perforate and substantially imperforate, a pair of alternate segments communicating with each other via said discontinuity in said baffle, and means for introducing glass into said imperforate segments of said bushing.

3,615,315

METHOD AND APPARATUS HAVING SEALING MEANS AND GASEOUS TAKEOFF FOR FLOAT GLASS

Edmund R. Michalik, West Mifflin, and George W. Misson, Pittsburgh, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 191,833, May 2, 1962, Pat. No. 3,241,937. Continuation of application Ser. No. 472,895, July 19, 1965, now abandoned.
Filed Sept. 20, 1968, Ser. No. 766,366
Int. Cl. C03b *18/00*
U.S. Cl. 65—25 A **6 Claims**



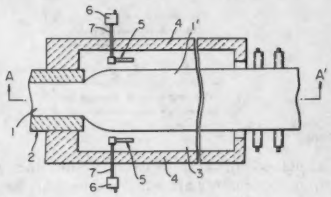
In the manufacture of float glass, a gaseous fluid is discharged against the bottom of the glass prior to the application of tractive force to at least partially support the glass after removal from the float bath. Also, seal means are provided at the glass entrance and exit ends of the float bath tank to prevent entry of air thereinto.

3,615,316

FLOAT GLASS METHOD AND APPARATUS WITH GAS EXTRACTION MEANS

Hideo Kita, Maizuru-shi, Japan, assignor to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed June 12, 1968, Ser. No. 736,337
Claims priority, application Japan, June 17, 1967, 42/38980
Int. Cl. C03b *18/02*
U.S. Cl. 65—27 **7 Claims**



Glass ribbon is continuously manufactured on a bath of molten metal while preventing the formation of gaseous bubbles in the bath by applying a negative pressure or vacuum to the bath through a gas-permeable, porous material which is nonwettable with the molten metal.

3,615,317

GLASS AND GLASS-CERAMIC TREATING PROCESS

Robert F. Jagodzinski, Maumee, and Fred E. Mansur, Toledo, both of Ohio, assignors to Owens-Illinois, Inc.

Filed Aug. 1, 1967, Ser. No. 657,487
Int. Cl. C03c *15/00, 29/00*
U.S. Cl. 65—30 **6 Claims**

A process for producing opaque surface crystallized glass bodies, for crystallizing glass to glass-ceramics, and for further crystallizing surface portions of transparent glass-ceramics to opaque glass-ceramics by use of high-intensity infrared radiation.

The invention also includes glass or glass-ceramic bodies wherein the surface of a transparent glass-ceramic is crystallized to a different degree than interior portions by use of high-intensity infrared radiation.

3,615,318

DECORATING PROCESS

Robert F. Jagodzinski, Maumee, and Louis Spanoudis, Toledo, both of Ohio, assignors to Owens-Illinois, Inc.

Filed Aug. 1, 1967, Ser. No. 657,488
Int. Cl. C03c *15/00, 29/00*
U.S. Cl. 65—30 **17 Claims**

A process for selectively decorating a transparent, glass-ceramic body or a thermally crystallizable glass body by the steps of coating selected surface areas with a compound or composition which is capable of selectively absorbing electromagnetic radiation, exposing the coated area to a source of electromagnetic radiation for a period of time so as to cause the glass-ceramic or glass body immediately under the coated areas to be heated to effect formation of opaque glass-ceramic surface areas on said body.

3,615,319

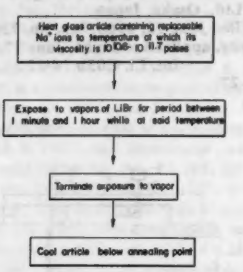
ION EXCHANGE STRENGTHENING OF GLASSES WITH LITHIUM VAPOR

Francis J. Shonebarger, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Dec. 11, 1967, Ser. No. 689,438
Int. Cl. C03c *21/00*
U.S. Cl. 65—30 **11 Claims**

Soda-lime glass articles are strengthened by exposure to vapors of certain lithium compounds while heated to or above the annealing point. Exposure at temperatures below the annealing point is avoided, to prevent etching the glass surface. Lithium ions migrate into a zone of the glassy

network underlying the exposed surface and partially replace alkali metal ions therein. Upon cooling, the lithium-enriched shell is placed in compression about the glass article. Strength improvements are achieved in short periods of time.

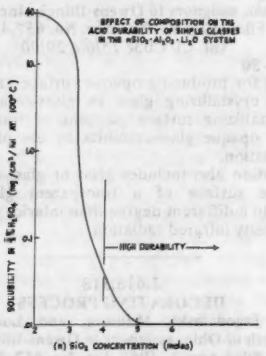

Heat glass article containing replaceable Na+ ions to temperature at which its viscosity is 10^10.6- 10^11.7 poises
Expose to vapors of LiBr for period between 1 minute and 1 hour while at said temperature
Terminate exposure to vapor
Cool article below annealing point

3,615,320

STRENGTHENED GLASS ARTICLE AND PROCESS FOR MAKING

Albert E. Junge, New Kensington; Arnold J. Thimons, Natrona Heights, and Donald R. Wenkhous, Gibsonia, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 13, 1968, Ser. No. 705,186
Int. Cl. C03c 21/00
U.S. Cl. 65—30 8 Claims


EFFECT OF COMPOSITION ON THE ACID DURABILITY OF SIMPLE GLASSES IN THE nSiO2·Al2O3·Li2O SYSTEM
SOLUBILITY IN ½N H2SO4 (mg/cm²/hr AT 100°C)
HIGH DURABILITY
(n) SiO2 CONCENTRATION (moles)

The invention relates to a novel glass composition and methods of strengthening glass articles thereof by ion exchange techniques. More particularly, this invention relates to lithia-alumina-silica glasses containing soda and boric oxide which can be melted and formed by conventional techniques, then strengthened by ion exchange of relatively large alkali metal ions from an external source for smaller alkali metal ions of the glass while maintaining the temperature of said glass below its strain point.

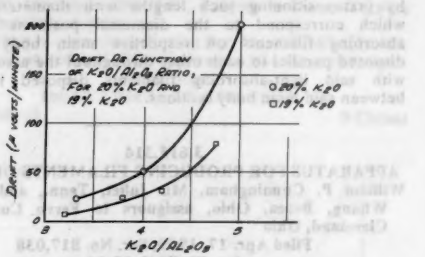
3,615,321

METHOD OF FORMING A POTASSIUM ION SENSITIVE GLASS ELECTRODE

Willis L. Carruth, Glendale, and Robert W. Negus, Arcadia, both of Calif., assignors to Cary Instruments, Monrovia, Calif.

Filed Apr. 15, 1968, Ser. No. 721,473
Int. Cl. C03c 21/00
U.S. Cl. 65—30 2 Claims

The method of making a glass electrode more sensitive to K^+ than to Na^+ in electrolytic solution includes the steps of forming a glass melt to have an initial composition of K_2O, Al_2O_3 and SiO_2 where the mol percents of K_2O and Al_2O_3 are chosen to optimize sensitivity ratio (K^+ sensitivity to Na^+ sensitivity) with low electrode output drift; digesting the melt for an extended period to substantially reduce the electrode output drift rate; and forming the electrode from the digest melt.



3,615,322

CHEMICAL STRENGTHENING OF GLASS ARTICLES PRODUCED WITH FLAME TREATMENT

Burton S. Bogart, and Paul D. Dilliard, both of Lancaster, Ohio, assignors to Anchor Hocking Glass Corporation, Lancaster, Ohio

Filed Sept. 30, 1968, Ser. No. 763,958
Int. Cl. C03c 21/00
U.S. Cl. 65—30 10 Claims

In the production of glass articles formed by a process including a flame treating step, and which are to be strengthened by ion exchange, much greater strength improvements can be obtained if alkali ions in the article are first exchanged with ions from an external source, and the article is thereafter subjected to the flame treatment rather than completing the flame treating step before ion exchange. The process has especially useful application in the production of blown soda-lime tumblers and similarly formed articles wherein a moil is cracked off leaving an edge requiring fire polishing and which is to be strengthened by an ion exchange technique.

3,615,323

METHOD OF INCREASING THE MECHANICAL STRENGTH OF GLASS ARTICLES

Johannes Cornelissen, and Arnoldus Martinus Marie DeRijk, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 3, 1969, Ser. No. 803,930
Claims priority, application Netherlands, Mar. 7, 1968, 6803210
Int. Cl. C03c 21/00
U.S. Cl. 65—30 2 Claims

A method of strengthening glass articles consisting essentially of an alkali-aluminosilicate glass by contacting the glass article while above the annealing point but below the softening point of the glass with a melt containing lithium ions and about 0.005 to 0.1 gram-ion per bath of silver ions to exchange Na^+ ions against Li^+ ions.

3,615,324

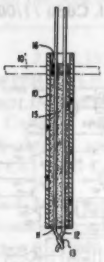
PROCESS FOR FORMING HERMETIC SEAL FOR SHEATHED ELECTRICAL CONDUCTORS

William D. Gordon, Lynn, and Robert S. Norman, Marblehead, both of Mass., assignors to General Electric Company

Division of Ser. No. 618,168, Feb. 23, 1967, Pat. No. 3,451,861.
Filed July 2, 1968, Ser. No. 741,935
Int. Cl. C03c 27/02, 17/00
U.S. Cl. 65—36 5 Claims

A process for forming a hermetic seal from a finely pulverized mixture of glass and 30–40 percent by weight of magnesium oxide. A finely pulverized mixture of a lead-potash-soda glass with 30–40 percent by weight of magnesium oxide is loaded into the area around the electrical conductors to be sealed. The powdered mixture is "pressed" to reduce porosity and compact the particles. Thereafter, the

mixture is heated to a temperature which drives off moisture and purges air from the mixture. Thereafter, the temperature is elevated at a rate to induce crystallization in the material



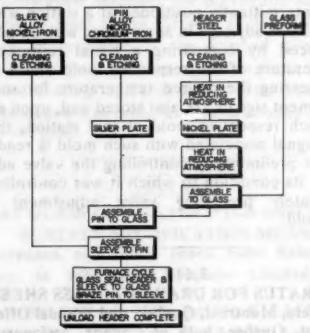
without causing stratification while raising the temperature to the working point of the glass in the seal mixture. Thereafter, the composition is cooled until it becomes rigid.

3,615,325

METHOD OF MAKING A SLEEVE-TYPE METAL TO GLASS TO METAL TO METAL SEAL

Robert C. Failing, Wilmington, N.C., assignor to General Electric Company

Filed June 2, 1967, Ser. No. 829,584
Int. Cl. C03c *27/02*
U.S. Cl. 65—43 **6 Claims**



A method of making a hermetic metal to glass to metal to metal seal of the sleeve type, wherein the component parts are formed into an integral structure by a simplified method and a one-step heating cycle.

3,615,326

METHOD OF ASSEMBLING ELECTRON DISCHARGE DEVICES HAVING SENSITIVE COMPONENTS HOUSED WITHIN A GLASS ENVELOPE

Nathan D. Levin, Los Altos Hills, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Jan. 14, 1969, Ser. No. 791,032
Int. Cl. C03b *33/00*
U.S. Cl. 65—56 **1 Claim**

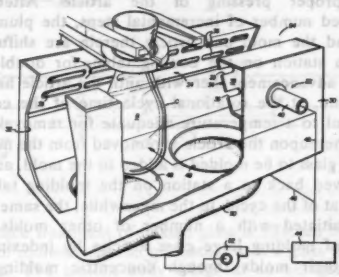
A method of assembling an electron discharge device having sensitive components housed within a glass envelope. The method comprises the steps of forming a glass envelope, breaking the glass envelope into two separable sections, housing sensitive components within at least one of the two envelope sections, and fusing the two separable sections back together with the sensitive components housed therewithin.

3,615,327

METHODS AND APPARATUS FOR APPLYING OXIDE COATING TO GLASS CONTAINERS

Steve M. McLary, Perrysburg, Ohio, assignor to Owens-Illinois, Inc.

Filed Aug. 20, 1969, Ser. No. 851,649
Int. Cl. C03c *17/00*
U.S. Cl. 65—60 **4 Claims**



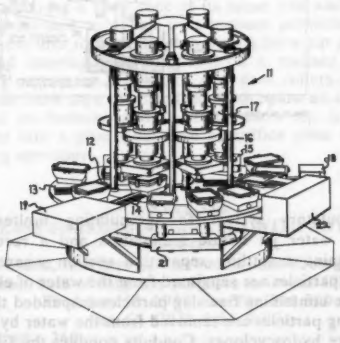
Methods and apparatus for applying a metallic oxide film to the outer surface of a glass container. A glass container is formed with an integral moil portion projecting upwardly from the container finish and is suspended from a support mechanism which engages only the moil portion at a location above the container finish. In the application of coatings with which the present invention is concerned, it is necessary that the container be at an elevated temperature, in the order of 1,000° F., and the coating is applied preferably while the container is still at this elevated temperature from the forming operation. The container is carried by the support mechanism through a spray tunnel which is open at its top so that the moil and support mechanism pass above, rather than through the tunnel. During passage of the container through the tunnel, it is conveyed in a vapor atmosphere having suspended particles of a metallic vapor compound the treating atmosphere being controlled and slightly above atmospheric pressure. Exhaust ducts opening in the bottom of the tunnel continuously exhaust the tunnel interior to prevent vapors from escaping from the interior of the tunnel.

3,615,328

ROTARY MOLDING METHOD OF PRESS SHAPING GLASS

James C. Coleman, Toledo, Ohio, assignor to Owens-Illinois, Inc.

Filed Jan. 23, 1969, Ser. No. 793,257
Int. Cl. C03b *11/02*
U.S. Cl. 65—72 **9 Claims**



This application discloses alternative embodiments of a method for press-molding glass articles, e.g. television picture tube faceplates or other glass items of similar shape. The

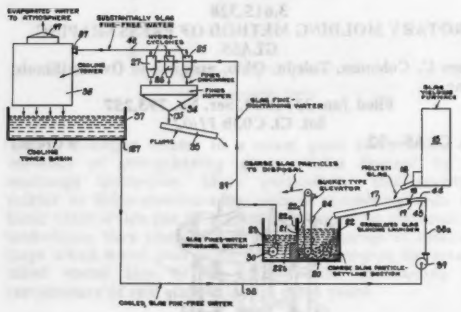
method employs incrementally indexing concentric tables, the inner table being a molding table with a first number of stations thereon, and the outer table being a cooling table with a second number of stations thereon. An article to be press molded is advanced with the molding table, in unison with a movable mold which is located at one of the stations thereof and an aligned reciprocatable plunger in molding contact therewith, for a number of single-step incremental steps of the table which is preselected to provide sufficient time for proper pressing of the article. After the predetermined number of incremental steps, the plunger is retracted and the mold and article therein are shifted, in unison, to a station on the cooling table, for double-step incremental advancement therewith until the article has had sufficient time, at the rotational cycle time of the cooling table, to cool to a temperature adequate for removal from the mold. Thereupon the article is removed from the mold, a fresh gob of glass to be molded is added to the mold, and the mold is moved back to a station on the molding table to begin a repeat of the cycle. In the meanwhile, the same cycle has been initiated with a number of other molds. The advantages of molding large glass articles by indexing the articles in their molds through concentric molding and cooling paths, which previously have been described in relationship to a molding path employing eight molding stations, can now be obtained in lower productivity methods, e.g. in six-station and in seven-station molding methods, and therefore with simpler and less expensive equipment, by advancing the molded article along the cooling path in double step increments rather than in single step increments.

3,615,329

A RECIRCULATORY SYSTEM FOR THE GRANULATION OF MOLTEN SLAG

Robert R. Jones, Jr., Salt Lake City, Utah, assignor to American Smelting and Refining Company, New York, N.Y.

Filed Mar. 18, 1969, Ser. No. 808,136
Int. Cl. C03b *5/22*; B02c *19/00*
U.S. Cl. 65—141 **10 Claims**



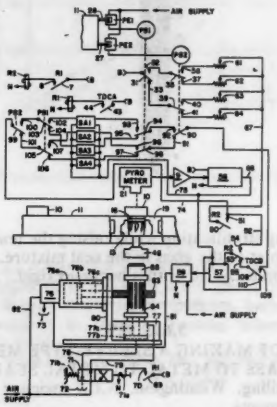
A recirculatory system for granulating molten slag comprising water jet nozzle granulators and a receptacle which contains a settling separation section wherein the coarse slag particles are separated from the water of elevated temperature containing fine slag particles suspended therein. The fine slag particles are removed from the water by use of one or more hydrocyclones. Conduits conduct the fine slag particle-free water of elevated temperature from the hydrocyclones to a cooling tower which cools the water. Conduits then conduct the cool water back to the jet nozzles.

3,615,330

AUTOMATIC SYSTEM FOR CONTROLLING THE TEMPERATURE OF A SERIES OF GLASS MOLDS

Joseph R. Jones, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed May 12, 1969, Ser. No. 823,578
Int. Cl. C03b *11/00*
U.S. Cl. 65—161 **4 Claims**



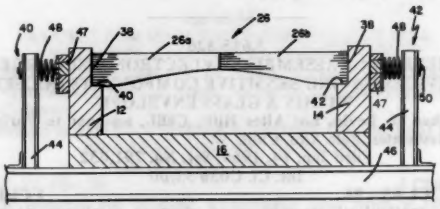
A system for automatically sensing and controlling the temperature of each of a plurality of molds to within a desired temperature range therefor, each such mold having a cooling fluid control valve associated therewith and each mold being intermittently positioned at a station where each respective valve is adjusted in accordance with an adjustment signal produced by comparing a signal representing the sensed temperature of the respective mold and a set point signal representing the desired temperature for such mold. Valve adjustment signals are also stored and, upon each next arrival of each respective mold at said station, the stored adjustment signal associated with such mold is read out and employed for preliminarily controlling the valve adjustment apparatus to its condition to which it was controlled during the immediately preceding valve adjustment for the respective mold.

3,615,331

APPARATUS FOR DRAWING GLASS SHEETS

Jean M. Peeters, Montreal, Quebec, and Wendel Offenbacher, St. Laurent, Quebec, both of Canada, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 29, 1970, Ser. No. 6,781
Claims priority, application Canada, Aug. 13, 1969, 059,410
Int. Cl. C03b *15/08*
U.S. Cl. 65—172 **17 Claims**



A two-piece drawbar of fused cast material is supported in the drawing kiln of glass drawing apparatus, the two drawbar pieces being held in aligned abutting end-to-end relation by devices which include compression springs for exerting a

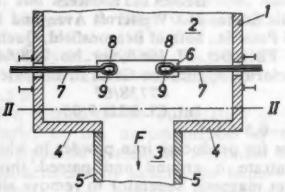
longitudinal compressive force on the drawbar while permitting longitudinal thermal expansion and contraction of the latter. The abutting end faces of the drawbar have grooves therein which correspond with each other to define apertures which snugly receive dowel members thereby to prevent misalignment of the drawbar sections during use.

3,615,332

GLASS TANK WITH A FLOAT SUPPORTED BY COOLING ELEMENTS

Robert Bourggraff, Cologne, and Franz Classen, Porz-Grengel, both of Germany, assignors to Erste Deutsche Floatglas GmbH. & Co., OHG Company, Porz am Cologne, Germany

Filed June 4, 1968, Ser. No. 734,405
Claims priority, application Germany, June 7, 1967, E34137
Int. Cl. C03b *5/18*
U.S. Cl. 65—178 **9 Claims**



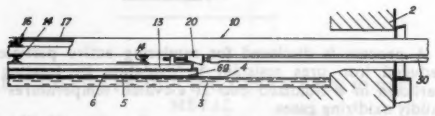
The specification describes the prevention of schlieren in glass drawn off from a tank furnace. In order to prevent the appearance of schlieren in the finished glass a float is arranged in the tank furnace upstream from the draw off channel and cooling elements extend from the float to the walls of the channel in order to exert a cooling action on the surface of the glass.

3,615,333

FLOAT GLASS APPARATUS WITH ADJUSTABLE SURFACE MODIFICATION MEANS

Jack Lawrenson, and David Jones, Saint Helens, England, assignors to Pilkington Brothers Limited, Liverpool, England

Filed Apr. 4, 1969, Ser. No. 813,655
Claims priority, application Great Britain, Apr. 23, 1968, 19148/68
Int. Cl. C03b *18/02*
U.S. Cl. 65—182 R **4 Claims**

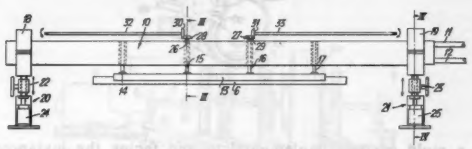


The surface of float glass is treated by a body of molten metal which clings to a locating member positioned adjacent the glass surface, and adjustable end-deflection means including a wedge lodged above the ends of the locating member to maintain the design geometry of the lower face of the locating member.

3,615,334

FLOAT GLASS APPARATUS WITH ADJUSTABLE SURFACE MODIFICATION MEANS

Jack Lawrenson, St. Helena, and Edward Morrison, Prescot, both of England, assignors to Pilkington Brothers Limited, Liverpool, England

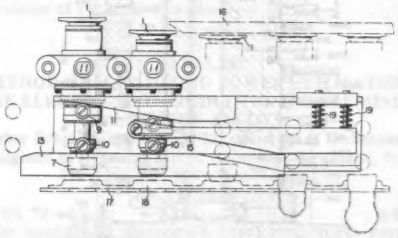
Filed Jan. 30, 1969, Ser. No. 795,240
Claims priority, application Great Britain, Feb. 19, 1968, 8021/68
Int. Cl. C03b *18/02*
U.S. Cl. 65—182 R **5 Claims**

Surface treatment of heated glass is effected by locating a body of molten material in contact with a glass surface to be treated. The molten body clings to an elongated locating member supported by a plurality of support members which are adjustable to maintain the locating member linear.

3,615,335

BLOW HEAD LINK OF GLASS BLOW MOLDING APPARATUS

Kuniaki Koshiishi, Tokyo-to, and Noboru Inoue, Funabashi-shi, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha (also known as) Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed July 28, 1969, Ser. No. 845,197
Claims priority, application Japan, July 31, 1968, 43/54078
Int. Cl. C03b *9/00, 9/28*
U.S. Cl. 65—243 **5 Claims**



A blow head device in a ribbon machine in which cam rollers or followers for following respective cams are fixed to a sleeve having a blow shoe at its upper end and fixed to a bushing secured to a link in a manner permitting vertical movement and to a blowpipe having a blow tip at its lower end and inserted into the sleeve in a manner permitting vertical movement. The cams and cam rollers operate to cause the blow shoe to enter the region below an air tank and contact its bottom, and then the blow tip is positively inserted into a glass ribbon on an orifice plate for a blow molding operation.

3,615,336

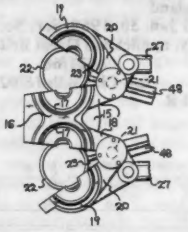
GLASS FORMING APPARATUS WITH ARTICLE SUPPORT

Rene Collard, Morlanwelz-Mariemont, and Georges Thyoux, Soignies, both of Belgium, assignors to Owens-Illinois, Inc.

Filed Jan. 16, 1969, Ser. No. 791,560
Int. Cl. C03b *9/04, 9/00*
U.S. Cl. 65—260 **4 Claims**

A glass forming apparatus comprising a mold with three separable sections including a fixed first section having mold cavities in opposed vertical faces thereof and a pair of

horizontally separable second sections mounted in movable relation on the sides of said first section, each section having

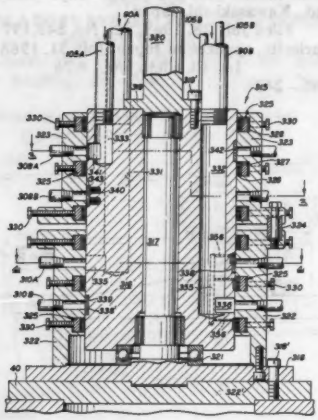


a mold cavity complemental to and facing the juxtaposed cavity of the first section.

3,615,337
SYSTEM MEANS FOR CONTROLLING THE FUEL SUPPLY TO BURNERS OF A GLASSWARE BURN-OFF MACHINE

James B. Legg, Columbus, Ohio, assignor to The Eldred Company, Columbus, Ohio

Filed Sept. 10, 1969, Ser. No. 856,560
Int. Cl. C03b *23/00*
U.S. Cl. 65—272 **5 Claims**



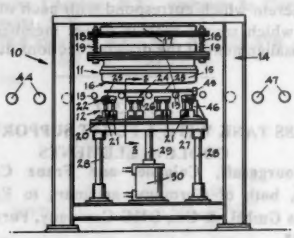
A system for controlling the supply of fuel to the burners of a glassware burn-off machine which burns off the moils from hollow glass articles. It includes means for separately controlling the supply of combustible gas and oxygen to separate superimposed cavities of double-duty burners of such a machine in which the one cavity produces a melting flame for the moil connection and the other cavity produces a more intense flame for completely severing that connection.

3,615,338
APPARATUS FOR PRESS BENDING GLASS SHEETS

Bobby J. Boyles, Perrysburg, Ohio, assignor to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Mar. 7, 1969, Ser. No. 805,244
Int. Cl. C03b *23/02*
U.S. Cl. 65—291 **6 Claims**

In apparatus for bending glass sheets in which at least one of the mold members comprises a relatively narrow shaping rail which contacts only a portion of the sheet, a plurality of yieldable resilient members mounting the rail on its base member. The resilient mounting insures that the entire area of the shaping rail will contact the sheet regardless of minor



variations in the contour of the shaping surface due to heat distortion and/or extended use.

3,615,339
PROCESS FOR PRODUCING IRON POWDER FROM HEMATITE ORES

W. J. Dennis Stone, 253 Westcroft Ave., and David Stewart Hay, 355 Penn St., both of Beaconsfield, Quebec, Canada

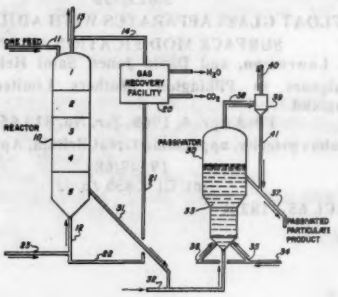
Filed Oct. 17, 1968, Ser. No. 768,543
Claims priority, application Great Britain, Oct. 19, 1967, 47738/67
Int. Cl. B22f *9/00*
U.S. Cl. 75—0.5 AA **8 Claims**

A process for producing iron powder in which a hematite ore concentrate is ground and passed through a high-intensity wet magnetic separator to remove silica and other acid insoluble impurities, after which the purified hematite is reduced in the presence of hydrogen to form iron powder.

3,615,340
QUENCHING AND PASSIVATION OF PARTICULATE METALS

Beverly B. Fuqua; William J. Metrailer; Marnell A. Segura, and Earl E. Turner, all of Baton Rouge, La., assignors to Esso Research and Engineering Company

Filed Nov. 18, 1968, Ser. No. 776,628
Int. Cl. B22f *9/00*; **C21b** *13/00*
U.S. Cl. 75—0.5 BA **10 Claims**



A process is disclosed for rendering active particles of reduced iron ores resistant to oxidation by treating the particles in a fluidized bed at elevated temperatures with mildly oxidizing gases.

3,615,341
NONLEAFING METALLIC FLAKE PIGMENT

Rolf Rolles, New Kensington, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 4, 1968, Ser. No. 781,265
Int. Cl. B22f *9/00*; **C09c** *1/64*
U.S. Cl. 75—0.5 A **8 Claims**

Use of acetylacetone to remove undesirable parent metal and iron fines from nonleafing metallic flake pigments.

3,615,342

PROCESS FOR PRODUCING IRON ORE PELLETS OF LOW ALKALI CONTENT AND CONTAINING FLUX MATERIAL

Conrad B. Bare, Coopersburg, Pa., assignor to Bethlehem Steel Corporation

Filed Aug. 27, 1969, Ser. No. 854,357
Int. Cl. C22b *1/08, 3/00*
U.S. Cl. 75—1 7 Claims

A process for treating iron ore pellets containing objectionably high contents of alkali, for example, about 0.25 percent to about 1.50 percent of sodium and/or potassium oxides. The process includes soaking the pellets in an aqueous solution of calcium chloride, drying the pellets and heating the pellets to reduce the alkali content to below about 0.15 percent. The pellets produced thereby are also described.

3,615,343

PROCESS FOR DECOMPOSING INTERMETALLIC COMPOUNDS IN METALS

Alex R. Valdo, and Freeman M. Sanderford, both of Baton Rouge, La., assignors to Ethyl Corporation, New York, N.Y.

Filed July 12, 1968, Ser. No. 744,307
Int. Cl. B22d *23/08;* B22f *9/00*
U.S. Cl. 75—0.5 B 11 Claims

This invention relates to the purification of alloys and more particularly, to the decomposition of undesirable intermetallic compounds present in aluminum alloys. The invention is characterized by heating the impure alloy to a temperature above the melting temperature of the intermetallic compound, maintaining this temperature for a time sufficient to allow the intermetallic compound to dissociate, and subsequently cooling the alloy under conditions which minimize reformation of the dissociated compound. In the cooling phase of the invention, good results have been realized by utilizing an ice water quench.

3,615,344

METHODS OF CONTROLLING THE PROCESS OF AGGLOMERATION

Henry Gilbert Meunier, and Johannes Joseph Luckers, both of Liege, Belgium, assignors to Centre National de Recherches Metallurgiques, Brussels, Belgium

Filed Nov. 29, 1968, Ser. No. 780,091
Claims priority, application Belgium, Dec. 1, 1967, 707459; 707460; 707461
Int. Cl. C21b *1/10*
U.S. Cl. 75—5 6 Claims

A method of agglomerating mineral materials by mixing them with fuel and then water and sintering, including the steps of continuously monitoring the process of agglomeration by measuring the permeability of the mixture before sintering and regulating the supply of water to ensure an appropriate permeability of the mixture to be sintered for the highest speed of sintering and for the desired quality of the agglomerate, said regulation of water supply process as a whole and of foreseeable disturbances in the process.

3,615,345

METHOD FOR PRODUCING ULTRA-HIGH PURITY METAL

George W. King, East Orange, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 28, 1968, Ser. No. 755,924
Int. Cl. C22d *7/00;* C22b *51/00, 51/20*
U.S. Cl. 75—10 10 Claims

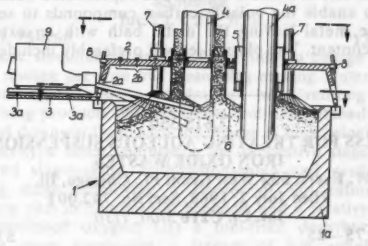
For electron-beam zone-refining of metal, at least one zone-refining pass is conducted in a hydrogen atmosphere at a system pressure sufficiently low to prevent formation of a hydrogen arc-discharge. This is followed by at least one zone refining pass in a high vacuum. The resulting metal is extremely pure.

3,615,346

PROCESS FOR PRODUCTION OF METALS IN AN ELECTRIC FURNACE

Johannes A. Reth, and Winfried H. Fettweis, both of Duisburg, Germany, assignors to Demag Elektrometallurgie G.m.b.H., Duisburg, Germany

Filed Aug. 23, 1968, Ser. No. 754,892
Claims priority, application Germany, Mar. 19, 1968, D 55615
Int. Cl. C22d *7/00;* C21c *5/52*
U.S. Cl. 75—10 9 Claims



In the production of metals and metal alloys from a charge of material containing at least one of manganese, silicon, and chromium, the charge of material is disposed within a closed combustion chamber and combustion air is directed into the closed space in a volume based on the conditions existing therein. A sufficient amount of combustion air is supplied to completely burn all of the CO in the reduction gases to form CO_2. The amount of combustion air supplied to the closed combustion space is in excess of the amount required to effect the complete combustion of the CO_2. Further, during the reduction operation, the charge is worked by stirring means or the like to assure the permeability of its surface for the release of the reduction gases.

3,615,347

METHOD OF MAXIMIZING POWER UTILIZATION IN THE ELECTRIC ARC PRODUCTION OF ALUMINIUM-SILICON ALLOYS

Walther Schmidt, and Hubert Martin, both of Richmond, Va., assignors to Reynolds Metals Company, Richmond, Va.

Filed Jan. 21, 1969, Ser. No. 792,769
Int. Cl. H05b *7/18*
U.S. Cl. 75—10 6 Claims

This application discloses a novel method for preparing alloys of 3and silicon in an electric furnace from a feedstock containing oxides of the relevant metals, carbon, and a metallic component. In this method, to the feedstock, which contains an oxidic component and sufficient carbon to reduce the oxidic component, the oxidic component containing alumina and silica in a ratio to about 2.0 to 6.0 parts of $A1_2O_3$/1 part SiO_2, there is added a metallic silicon compound and the arc furnace is operated with at least one electrode having an arc voltage E and an amperage I, determined for the current flowing in the individual electrode, having a ratio of E^3/I of about 2 to 10.

3,615,348

STAINLESS STEEL MELTING PRACTICE

Harry Tanczyn, Baltimore, Md., assignor to Armco Steel Corporation, Middletown, Ohio

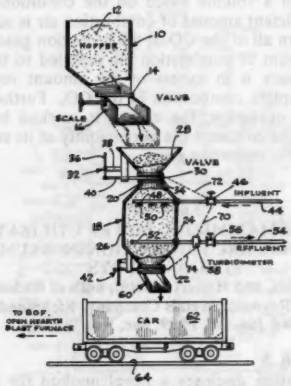
Filed July 31, 1968, Ser. No. 748,969
Int. Cl. C21c *5/52, 7/00, 39/11*
U.S. Cl. 75—11 9 Claims

Melting a charge comprising alloys of iron and chromium in an electric arc furnace to achieve metal of maximum cleanliness with minimum oxide inclusions but of high-carbon content, and then ridding the metal of carbon in a vacuum furnace by way of readily reducible oxides and low pressure.

3,615,349
PRODUCTION OF ALLOYS OF IRON
William Bleloch, 17 Rockridge Road, Parktown, Johannesburg, South Africa
Filed Jan. 3, 1969, Ser. No. 788,788
Claims priority, application South Africa, Jan. 10, 1968, 68/0176
Int. Cl. C21c *5/52*, B23b *9/00*
U.S. Cl. 75—12 20 Claims

The invention is concerned with the extraction of carbon from ferroalloys, iron and alloy steels by the use of a high-velocity high-temperature plasma jet of a gas having an affinity to form stable volatile carbon compounds but a passivity towards ferrous metals at such high temperatures. The jet is directed into a molten and superheated bath of the metal to enable the volatile carbon compounds to separate from the metal leaving the metal bath with an extra low carbon content. The plasma jet will preferably include water vapor.

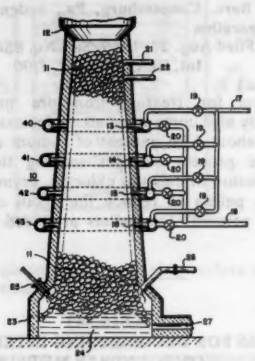
3,615,350
PROCESS FOR TREATING AQUEOUS SUSPENSIONS OF IRON OXIDE WASTES
Robert W. Evers, 532 West Grant Pl., Chicago, Ill.
Filed July 2, 1968, Ser. No. 742,001
Int. Cl. C21b *3/00*, *1/30*
U.S. Cl. 75—25 5 Claims



A process for treating aqueous suspensions of the type resulting from the manufacture and processing of steel and iron whereby the suspended matter is recovered and utilized in the iron and steel manufacturing processes.

3,615,351
DIRECT GASEOUS REDUCTION OF IRON OXIDE
John Happel, Hastings-on-Hudson, and Joachim Hillard Blanck, Glen Oaks, both of N.Y., assignors to Northfield Mines, Inc., New York, N.Y.
Continuation-in-part of application Ser. No. 468,864, July 1, 1965, now abandoned. This application Aug. 29, 1969, Ser. No. 854,213
Int. Cl. C21b *13/02*
U.S. Cl. 75—38 13 Claims

Molten iron is produced directly from high grade iron oxide ore by the direct reduction in a vertical shaft furnace of preheated ore with hydrogen and carbon monoxide gaseous mixtures. The mixtures of hydrogen and carbon monoxide are adjusted to maintain a continuously increasing H_2:CO ratio in the direction the charge passes through the vertical reduction zone while maintaining about the same

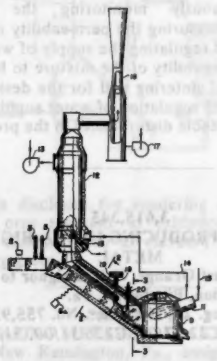


temperature, below about 1,100° C., throughout the entire reduction zone.

3,615,352
PROCESS FOR REDUCTION OF IRON ORE IN STAGED BEDS WITHOUT BOGGING
Francis X. Mayer, Baton Rouge, La., assignor to Esso Research and Engineering Company
Continuation-in-part of application Ser. No. 398,073, Sept. 21, 1964, now abandoned, Continuation-in-part of application Ser. No. 422,559, Dec. 31, 1964, now Patent No. 3,393,066. This application Apr. 24, 1968, Ser. No. 723,874
Int. Cl. C21b *1/02*, *15/00*
U.S. Cl. 75—26 11 Claims

A multistage, high temperature fluidized iron ore reduction process is described wherein bogging or defluidization is prevented by adding specified particulate agents to ferrous reduction zones.

3,615,353
APPARATUS AND PROCESS OF SMELTING SCRAP
Harold A. Mahoney, 24 Wellsford St., Pittsburgh, Pa.
Continuation-in-part of application Ser. No. 501,516, Oct. 22, 1965, now abandoned. This application Mar. 15, 1968, Ser. No. 713,346
Int. Cl. C21b *13/00*
U.S. Cl. 75—43 17 Claims



A water-cooled inclined smelter for loose or baled scrap metal coated with finely divided or beneficiated iron ore and sprayed with coke and a slag forming material. When baled, the flux and slag are applied to the top edge portions and partly overlie the sides of the bales. At a substantial distance

below the entrance of the smelter, a pipe extends through the top wall of the smelter through which molten pig iron is passed onto the scrap between the edges of the flux and slag forming material. A lance extends through the top of the smelter below the pig iron pipe and has a central chamber through which a hydrocarbon and a separate water-cooled chamber through which oxygen are applied to the scrap metal. The hydrocarbon passing into contact with the hot metal scrap is cracked and the nascent carbon reacts with oxygen from the lance and in the ore and slag to form carbon monoxide and the oxygen, carbon, and carbon monoxide react in the presence of the hot metal scrap and the refractory lining of the furnace which act as catalysts to provide a temperature of iron approximately 5800 to 6000° F. The portion of the smelter below the lance is flared outwardly and is connected to a hearth which has one or more burners directed onto the molten metal and slag flowing through the shallow refinery to keep the metal and slag hot. The carbon monoxide generated in the smelter and the shallow refinery passes above the metal flowing downwardly through the inclined smelter to partially reduce the iron ore and is burned in a recuperator in heat exchange relation with air which air is passed to the burner or burners in the hearth to support combustion. The smelter is substantially closed to extraneous air and as the carbon monoxide is burned in the recuperator, a slight vacuum is formed in the smelter lessens the amount of oxygen that is required. Phosphorus and sulfur pass into the slag in the shallow refinery and at the high temperature, molten copper and other heavy nonferrous metal settle below the steel and may be removed separately from the hearth.

3,615,354

METHOD OF REMOVING CONTAMINANTS FROM STEEL MELTS

Sundaresan Ramachandran, Natrona Heights, Pa., assignor to Allegheny Ludlum Steel Corporation, Brackenridge, Pa.

Filed Apr. 30, 1968, Ser. No. 725,510
Int. Cl. C21c *7/02, 7/06*
U.S. Cl. 75—58 **7 Claims**

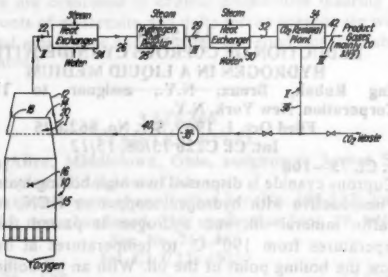
Described herein is a method of removing contaminants such as oxygen and sulfur from steel which includes the step of adding to a molten steel melt a mixture of a reactive alkali or alkaline earth metal and a halide of the metal adjusted so that the proportion of metal does not exceed its solubility in the halide.

3,615,355

METHOD OF COLLECTING AND TREATING EXHAUST GASES CONTAINING CARBON MONOXIDE

Geoffrey Frederick Skinner, Pinkneys Green, England, assignor to Foster Wheeler Corporation, Livingston, N.J.

Filed Sept. 9, 1968, Ser. No. 758,359
Claims priority, application Great Britain, Sept. 8, 1967, 41169/67
Int. Cl. C21c *5/38;* **C07c** *29/16*
U.S. Cl. 75—60 **3 Claims**



This invention relates to the use of the blow gases containing carbon monoxide which are derived from steelmaking processes. A joint must be provided between the steel converter apparatus and a collection pipe through which the blow gases are conveyed for use and, in view of very high temperature of the gases, it is difficult to provide a secure sealed joint. Therefore according to the invention the joint is sealed by a blast of carbon dioxide which prevents the egress of the blow gases past the joint to the atmosphere.

3,615,356

BASIC STEELMAKING PROCESS

Hugh W. Grenfell, Glamorgan, South Wales, England, assignor to British Steel Corporation, London, England

Filed Nov. 18, 1968, Ser. No. 776,417
Claims priority, application Great Britain, Sept. 26, 1968, 45809/68
Int. Cl. C21c *5/28*
U.S. Cl. 75—60 **13 Claims**

A basic steelmaking process for refining a charge of steel scrap, molten pig iron and basic slag-making material in a converter-type vessel employing hot refining gases comprising products of combustion and uncombined oxygen directed downwardly toward the charge at high velocity from a burner-type lance comprising the successive stages: (I) a fuel-fired slag-making, bath-conditioning and preliminary-refining stage employing a stream of hot refining gas relatively rich in combustion products and a relatively poor in uncombined oxygen; (II) a fuel-fired decarburization-refining stage employing a stream of hot refining gas relatively poor in combustion products and relatively rich in uncombined oxygen; and (III) a fuel-fired terminal-refining and regulating stage employing a stream of hot refining gas relatively rich in combustion products and relatively poor in uncombined oxygen.

3,615,357

REMOVAL OF TIN FROM COPPER SCRAP

Eugene Wainer, Shaker Hts., Ohio, assignor to Horizons Research Incorporated

Filed Feb. 20, 1970, Ser. No. 13,212
Int. Cl. C22b *25/06;* **C01g** *19/06, 19/08*
U.S. Cl. 75—64 **8 Claims**

Removal of metallic tin from copper scrap on which the tin is present as a coating by heating in a controlled atmosphere whereby the tin is removed as a volatile chloride.

3,615,358

PROCESS FOR THE PREPARATION OF POTASSIUM METAL

Marcel Delassus, Mazingarbe, and Christian Vaniscotte, Vermelles, both of France, assignors to Houilleres du Bassin du Nord & du Pas-de-Calais, Douai (Nord), France

Continuation-in-part of application Ser. No. 603,110, Dec. 20, 1966, now abandoned. This application Aug. 21, 1969, Ser. No. 852,117
Int. Cl. C22b *27/00*
U.S. Cl. 75—66 **3 Claims**

Metallic potassium is prepared from potassium hydroxide or potassium carbonate by reduction with silicon at 1100° to 1200° C. under an inert atmosphere, the potassium hydroxide or potassium carbonate and silicon being in the form of a finely divided mixture with silica and lime in amounts sufficient to convert the potassium hydroxide or carbonate into a silicate and for conversion of all of the silica into calcium silicate, respectively.

3,615,359

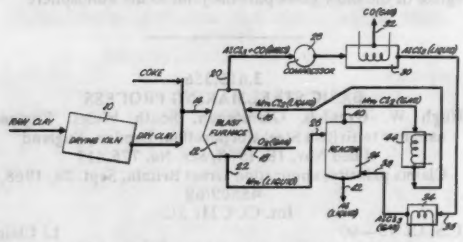
PROCESS FOR PRODUCING ALUMINUM

Charles Toth, Westwego, La., assignor to Applied Aluminum Research Corporation, Westwego, La.

Filed Dec. 20, 1967, Ser. No. 692,036
Int. Cl. C22b *21/02, 47/00;* **C01g** *45/06*
U.S. Cl. 75—68 R **15 Claims**

A process for producing aluminum involving reacting alumina under reducing conditions in the presence of carbon with manganese chloride to form aluminum trichloride and

manganese and reacting the latter at a temperature sufficient to reduce said aluminum trichloride to aluminum. A process

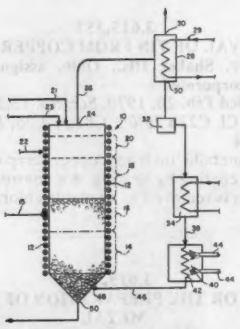


for producing aluminum from aluminum trichloride involving the use of manganese as a reducing agent.

3,615,360
PROCESS FOR THE CONTINUOUS PRODUCTION OF ALUMINUM

Harry Gordon Harris, Jr., Metairie; Raymond V. Bailey, New Orleans, and Charles Toth, Westwego, all of La., assignors to Applied Aluminum Research Corporation, Westwego, La.

Filed Oct. 6, 1969, Ser. No. 863,924
Int. Cl. C22b *21/02*; **C01f** *7/60*; **C01g** *45/06*
U.S. Cl. 75—68 R **7 Claims**



Process for the continuous production of aluminum from the reaction of aluminum trichloride and manganese. Four principal zones connected to permit the necessary reactant flows are provided within a single column of a reactor furnace, an upper chlorination zone for forming aluminum trichloride, a manganese oxide reduction zone for forming manganese, an aluminum trichloride reduction zone for forming aluminum from aluminum trichloride and manganese and a lower rectification zone for continuous withdrawal of high-purity aluminum.

3,615,361
FIRE REFINING OF COPPER

Paul E. Queneau, Fairfield, Conn., and Charles E. O'Neill, Oakville, Ontario, Canada, assignors to The International Nickel Company Inc., New York, N.Y.

Filed Apr. 4, 1969, Ser. No. 813,769
Claims priority, application Canada, May 2, 1968, 018,994
Int. Cl. C22b *15/06, 23/06*
U.S. Cl. 75—73 **24 Claims**

A process is disclosed for fire-refining copper sulfide having a copper to nickel ratio of more than about 7:3, which process comprises maintaining a molten bath of copper sulfide in a turbulent state to volatilize at least about 50 percent of at least one impurity from the group consisting of bismuth, lead, tin and zinc, then surface blowing the turbulent bath of copper sulfide with a free-oxygen-containing gas to convert a minor portion of the copper sulfide to an immiscible metal phase in which at least one element from the group consisting of antimony, arsenic, bismuth, lead, tin and the precious metals is concentrated. After removing the immiscible metal phase the turbulent supernatant bath of copper sulfide is converted to liquid copper which is substantially saturated with oxygen by surface blowing with free oxygen-containing gas. At least one impurity from the group consisting of lead, selenium, sulfur, tellurium and tin are volatilized from the molten copper and the molten copper is thereafter treated with a reducing gas to lower the oxygen content to at least about 0.1 percent.

3,615,362
SLAGGING IN TOP BLOWN CONVERTERS

John Stuart Warner, Oakville, Ontario, Canada, and Paul Etienne Queneau, Fairfield, Conn., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Feb. 14, 1969, Ser. No. 799,318
Int. Cl. C22b *7/00, 15/14, 23/06*
U.S. Cl. 75—75 **28 Claims**

Nonferrous mattes containing iron are treated to slag iron therefrom. A bath of the matte is established and the iron content thereof is lowered to about 10 percent. When the iron content of the matte has been lowered to about 10 percent, a turbulent bath of the matte is treated with an oxygen-transfer slag containing about 25% to 35% SiO_2 and 5% to 35% Fe_2O_3 while surface blowing the slag with a free-oxygen-containing gas to lower the iron content of the matte to less than about 1 percent. Advantageously, the final stages of iron removal are conducted at temperatures in excess of about 1,250° C.

3,615,363
PROCESS AND APPARATUS FOR RECOVERY OF MERCURY FROM ORES CONTAINING IT

Leopoldo Ruiz Montes de Oca, San Francisco 15, Mexico City 12, Mexico

Filed Nov. 8, 1968, Ser. No. 774,327
Int. Cl. C22b *43/00*
U.S. Cl. 75—81 **8 Claims**

A process and apparatus for the recovery of mercury from mercury ores comprises heating a body of the ore in a closed chamber to decompose it into mercury and other vapors, transferring the vapors by means of a jet of injected air to a condensing system formed by at least one generally spirally disposed horizontal conduit having its lower portion open and immersed in a body of cooling water and its upper surface cooled by a water spray, and collecting the condensed liquid mercury in a trough containing the water located under the conduit, and having a sloping bottom to facilitate collection.

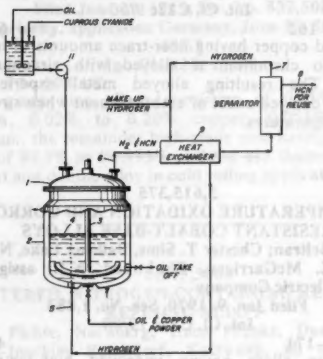
3,615,364
REDUCTION OF CUPROUS CYANIDE WITH HYDROGEN IN A LIQUID MEDIUM

Irving Rubak, Bronx, N.Y., assignor to Treadwell Corporation, New York, N.Y.

Filed Oct. 1, 1969, Ser. No. 862,805
Int. Cl. C22b *15/08, 15/12*
U.S. Cl. 75—108 **10 Claims**

Cuprous cyanide is dispersed in a high boiling hydrocarbon oil nonreactive with hydrogen, copper or HCN, such as a paraffin mineral oil, and hydrogen is passed through at temperatures from 190° C. to temperatures at or a little below the boiling point of the oil. With an oil boiling above 325° C., suitable temperatures are from a little below 300° C. to approximately 325° C. Hydrogen is passed through at a rate and for a time to produce a substantial excess, for example at least 50 percent excess, and the cuprous cyanide is reduced almost quantitatively to a very pure copper powder. After reduction is complete, the copper powder is separated

from the oil, the last traces of oil being removed by known means, such as solvent washing, or removed when the copper

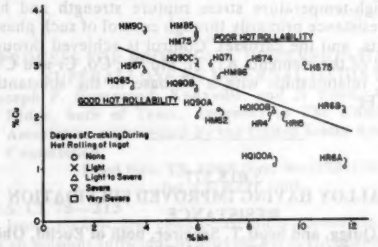


is melted. The excess hydrogen carries with it HCN formed in the reduction, and the two are separated and reused.

3,615,365
AUSTENITIC STAINLESS STEEL

Thomas H. McCunn, Lower Burrell, Pa., assignor to Allegheny Ludlum Steel Corporation, Brackenridge, Pa.

Continuation of application Ser. No. 315,957, Oct. 14, 1963, now abandoned. This application Apr. 18, 1968, Ser. No. 738,363
Int. Cl. C22c *39/54*
U.S. Cl. 75—125 **4 Claims**



This invention concerns an austenitic stainless steel composed principally of manganese, chromium and nickel and which contains small, but in some cases significant, amounts of carbon, silicon, copper and nitrogen. The materials are combined in critical proportions insuring that the amounts of martensite and delta ferrite present are within controlled maximums and insuring that good hot workability is maintained.

3,615,366
STAINLESS STEEL

Paul M. Allen, Middletown, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio

Continuation-in-part of application Ser. No. 305,533, Aug. 29, 1963, now abandoned. This application Sept. 20, 1968, Ser. No. 761,346
Int. Cl. C22c *39/20*
U.S. Cl. 75—125 **13 Claims**

Stainless steel characterized by a combination of ductility and low work-harding rate, and containing carbon up to 0.15%, manganese 3% to 10%, phosphorus not exceeding 0.06% sulfur not exceeding 0.03% silicon 0.15% to 1%, chromium 15% to 19%, nickel 3.5% to 6%, copper 0.5% to 4%, nitrogen 0.04% to 0.4% with a nitrogen content of at least 0.07% for the maximum values of carbon, manganese and nickel, and a chromium content of about 19%, and remainder iron.

3,615,367
LOW-LOSS MAGNETIC CORE OF FERRITIC STRUCTURE CONTAINING CHROMIUM

Harry Tanczyn, Baltimore, Md., assignor to Armco Steel Corporation, Middletown, Ohio

Filed July 31, 1968, Ser. No. 748,927
Int. Cl. C22c *39/14*
U.S. Cl. 75—126 D **5 Claims**

Corrosion-resistant magnetic core of low hysteresis loss and low eddy-current loss and alloy containing about 9% to 20% chromium, about 0.01% to 3% silicon and/or aluminum, manganese up to about 4%, carbon up to about 0.15%, about 0.15% to 1% sulfur and/or selenium, about 0.02% to 1% titanium and/or zirconium, and remainder substantially iron.

3,615,368
NICKEL-CHROMIUM STEEL HAVING INCREASED RESISTANCE TO CORROSION

Anton Baumel, Kapfenberg, Austria, assignor to Gebr. Bohler & Co., Aktiengesellschaft, Vienna, Austria

Filed June 14, 1968, Ser. No. 736,988
Claims priority, application Austria, June 19, 1967, A5678/67
Int. Cl. C22c *39/20*
U.S. Cl. 75—128 A **3 Claims**

A nitric acid resistant nickel-chromium steel which, when welded, effectively prevents the formation of intermetallic deposits at the grain boundaries in the weld area. The composition of this steel consists essentially of up to 0.15% carbon, 2–6% silicon, 0–6% manganese, 16–25% chromium, 10–25% nickel, 0.08–2% nitrogen, and the remainder being iron and unavoidable impurities.

3,615,369
AUSTENITIC STAINLESS STEELS

John Michael Francis, Thornbury, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Jan. 8, 1968, Ser. No. 696,381
Claims priority, application Great Britain, Jan. 19, 1967, 2954/67
Int. Cl. C22c *39/20, 39/26, 39/54*
U.S. Cl. 75—128 **6 Claims**

An austenitic stainless steel alloy consisting of essentially less than 0.07% carbon, less than 0.05% manganese, 0.25–0.75% silicon, 24–26% nickel, 19–21% chromium, up to 0.75% niobium remainder iron and incidental impurities, the percentage being by weight. Optionally the steel may include yttrium or gadolinium within the range 0.025–1 weight percent.

3,615,370
HEAT-RESISTING CHROMIUM-MOLYBDENUM-VANADIUM STEEL

Kenneth Arnold Ridal, and John McCann, both of Yorkshire, England, assignors to English Steel Corporation Limited, Yorkshire, England

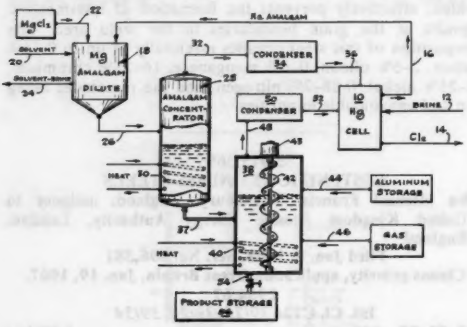
Filed June 19, 1968, Ser. No. 738,103
Claims priority, application Great Britain, June 29, 1967, 30,157/67
Int. Cl. C22c *39/20*
U.S. Cl. 75—128 B **6 Claims**

A heat-resisting alloy steel which is basically a 1 percent chromium-molybdenum-vanadium steel, with the addition of at least one element selected from the group comprising titanium, tantalum and niobium in the range from 0.03 to 0.15 total percentage by weight, from 0.002 to 0.010 percent by weight boron and from 0.5 to 3.0 percent by weight cobalt. High-creep strength, rupture ductility and tensile strength properties are developed by austenitizing the steel in the range 950° C. to 1,060° C., hardening by cooling, and tempering in the range 600° C. to 700° C. for from 3 to 60 hours.

3,615,371
ALUMINUM ALLOY FOR ELECTRIC CONDUCTOR
Katsuhisa Nakajima; Yasuo Maeda, and Sadao Inoue, all of Kiyotaki, Nikko, Japan, assignors to The Furukawa Electric Company Limited, Tokyo, Japan
Filed Mar. 12, 1968, Ser. No. 712,357
Claims priority, application Japan, Apr. 8, 1967, 42/22380
Int. Cl. C22c 21/00
U.S. Cl. 75—147 1 Claim

This aluminum alloy for electric conductor consists of a ternary Al-Mg-RE alloy containing less then 0.6 weight percent of one or more of rare earth metals and has improved castability, weldability, fatigue strength and antisoftening characteristics on heating at a high temperature and is applicable to the continuous casting and rolling method and the rolling method using large ingots for the purpose of easily manufacturing aluminum alloy conductor having excellent characteristics.

3,615,372
METHOD OF PREPARING ALUMINUM-MAGNESIUM ALLOYS
David G. Braithwaite, Chicago, Ill., assignor to Nalco Chemical Company, Chicago, Ill.
Filed Jan. 5, 1970, Ser. No. 617
Int. Cl. C22c 21/00
U.S. Cl. 75—147 10 Claims



Aluminum-magnesium alloys which contain from 50 to 98.6 percent by weight of aluminum may be prepared by adding oxide-free aluminum to a magnesium amalgam to form a binary amalgam which is then heated to a temperature sufficient to distill the mercury therefrom. This leaves as a distillation residue the alloys of the invention. The distillation is conducted under conditions of agitation and in the presence of an oxygen-free gas which is incapable of reacting with either aluminum, magnesium, mercury or combinations thereof. The aluminum-magnesium alloys produced by the process of the invention which contain from 50 to 70 percent by weight of aluminum are particularly useful in producing well-known commercial aluminum alloys which contain 1.4 to 5 percent magnesium.

3,615,373
ALLOY FOR PAPERMAKING WIRE
Lothar Bangert, Reutlingen, Germany, assignor to Hermann Wangner, Reutlingen, Germany
Filed June 10, 1969, Ser. No. 831,989
Claims priority, application Germany, June 14, 1968, P 17 58 501.2
Int. Cl. C22c 9/02; B21f 27/00
U.S. Cl. 75—154 3 Claims

Wire cloth for papermaking machines of improved abrasion and corrosion resistance is formed by using warp wires of an alloy comprising tin, phosphorus, nickel, copper, either manganese or iron or both, and, optionally, silicon.

3,615,374
ALLOYED COPPER
Herbert Greenwald, Jr., Upper Arlington, Ohio, assignor to Berry Metal Company, Harmony, Pa.
Filed Nov. 18, 1969, Ser. No. 877,879
Int. Cl. C22c 9/00
U.S. Cl. 75—162 6 Claims

Deoxidized copper having near-trace amounts of iron and possibly also chromium is alloyed with zirconium and aluminum. The resulting alloyed metal experiences a significantly delayed onset of embrittlement when stressed at elevated temperatures.

3,615,375
HIGH-TEMPERATURE OXIDATION AND CORROSION-RESISTANT COBALT-BASE ALLOYS
Adrian M. Beltran; Chester T. Sims, Ballston Lake, N.Y., and Donald E. McGarrigan, Blackwood, N.J., assignors to General Electric Company
Filed Jan. 9, 1970, Ser. No. 1,884
Int. Cl. C22c 19/00
U.S. Cl. 75—171 4 Claims

Cobalt-base alloys having improved high-temperature strength and ductility characteristics and corrosion resistance consist essentially of, in percent by weight, carbon 0.1 to 0.7, chromium 24 to 35, tungsten 6 to 9, nickel 8.5 to 11.5, boron in an effective amount of about 0.005 up to 0.05, iron up to 2, zirconium 0.1 to 1,7, yttrium 0.03 to 1, with the remainder essentially cobalt except for impurities.

3,615,376
CAST NICKEL BASE ALLOY
Earl W. Ross, Cincinnati, Ohio, assignor to General Electric Company
Filed Nov. 1, 1968, Ser. No. 772,796
Int. Cl. C22c 19/00
U.S. Cl. 75—171 3 Claims

An improved cast nickel base alloy has a combination of stability, high-temperature stress rupture strength and hot corrosion resistance primarily through control of such phases as sigma, eta, and the carbides. Control is achieved through the balance of the elements Al, Ti, Mo, W, Co, Cr and C in the proper relationships with a Ni base in the substantial absence of Fe.

3,615,377
SUPERALLOY HAVING IMPROVED SULFIDATION RESISTANCE
Richard J. Quigg, and Scott T. Scheirer, both of Euclid, Ohio, assignors to TRW Inc., Cleveland, Ohio
Filed Aug. 5, 1966, Ser. No. 570,395
Int. Cl. C22c 19/00
U.S. Cl. 75—171 2 Claims

An alloy being resistant to sulfidation attack having a nickel base and chromium in an amount not more than about 13 percent, the sulfidation resistance being supplied by the addition of up to 1 percent of vanadium, or tantalum, or both.

3,615,378
METASTABLE BETA TITANIUM-BASE ALLOY
Howard B. Bomberger, Jr., Canfield; Stanley R. Seagle, Warren, and Ronald R. Seeley, Canfield, all of Ohio, assignors to Reactive Metals, Inc.
Filed Oct. 2, 1968, Ser. No. 764,585
Int. Cl. C22c 15/00
U.S. Cl. 75—175.5 8 Claims

A metastable beta titanium-base alloy in which beta stability is achieved by optimum addition of beta-eutectoid element (iron, manganese, chromium and/or cobalt). Also included are beta-isomorphous elements (vanadium and/or molybdenum), aluminum, and optionally one or both the neutral elements (tin and zirconium). Alloy is readily formable at room temperatures and can be heat-treated to high tensile strength.

3,615,379

HIGH-GRADE ZINC ALLOYS

Erich Pelzel, Stolberg, Germany, assignor to Stolberger Zink Aktiengesellschaft fur Bergbau und Huttenbetrieb, Aachen, Germany

Filed June 11, 1969, Ser. No. 832,508
Claims priority, application Germany, June 12, 1968, P 17 58 489.3
Int. Cl. C22c *17/00*
U.S. Cl. 75—178 AC 4 Claims

High-grade zinc alloys consisting of 0.05% to 0.25% titanium, 0.02% to 0.20% copper, 0.005% to 0.05% aluminum, the remainder high-grade zinc having a degree of purity of 99.9% to 99.995% and the use thereof as a creep resistant and ductile alloy in cold rolling applications.

3,615,380

SINTERED, NITROGEN-CONTAINING KEY STEEL REFINING ALLOY

Rudolf Fichte, Nurnberg; Hans Franke, Dusseldorf, and Hans-Joachim Retelsdorf, Katzwang, all of Germany, assignors to Gesellschaft Fur Elektromelallurgie mbH, Dusseldorg, Germany

Filed May 14, 1968, Ser. No. 728,873
Claims priority, application Germany, May 19, 1967, P 15 58 500.9
Int. Cl. B22f *1/00*
U.S. Cl. 75—213 9 Claims

A useful method of making key alloys for refining steel by addition to the steel melt whereby alloying elements and nitrogen may be incorporated in the steel, consists of nitriding a nitridable metal or metal alloy, which alloy may be an alloy of two nitridable alloys or a ferroalloy of a nitridable metal, by exposing the metal or alloy to a nitriding atmosphere at an elevated temperature.

3,615,381

PROCESS FOR PRODUCING DISPERSION-HARDENED SUPERALLOYS BY INTERNAL OXIDATION

Joseph P. Hammond, Knoxville, and Ji Young Chang, Oak Ridge, both of Tenn., assignors to The United States of America as represented by the United States Atomic Energy Commission

Filed Nov. 13, 1968, Ser. No. 775,475
Int. Cl. B22f *1/00*
U.S. Cl. 75—213 3 Claims

Iron-, nickel-, and cobalt-base alloys containing chromium in an amount sufficient to provide excellent scaling resistance to high temperature are made pervious to controlled quantities of oxygen by alloying with an appropriate amount of a metal selected from thorium, yttrium, or one of the rare earth (*4f*) metals to form a lamellar eutectic structure. Powders of these alloys are roasted in air to pick up oxygen, then cold compacted and sintered to consolidate the mass while at the same time allowing diffusion of oxygen to form a uniform and ultrafine dispersion of stable oxide particles. Subsequent hot mechanical working shapes and further consolidates the alloy while improving the distribution of metal oxide particles.

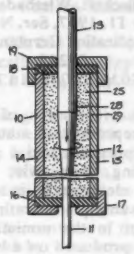
3,615,382

PRODUCTION OF TUBULAR PRODUCTS FROM METALLIC POWDERS

Charles E. Manilla, Huntington, W. Va.; Franklin C. Kelly, Chesapeake, Ohio, and Richard H. Hanewald, Huntington, W. Va., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Aug. 29, 1968, Ser. No. 756,222
Int. Cl. B22f *3/12*
U.S. Cl. 75—214 13 Claims

Tubular-shaped powder metallurgical compacts are made by process comprising subjecting a mass of metallic powder confined in a tubular cavity to pressure directed outwardly from the interior of the cavity and progressing continuously from one end of the mass to the other.

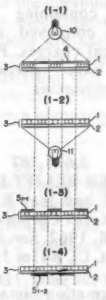


3,615,383

CHARGELESS ELECTROPHOTOGRAPHIC PRINTING PROCESS

Eiichi Inoue; Ichiro Endo, Tokyo, and Kunihiro Fukushima, Kawasaki-shi, all of Japan, assignors to Canon Camera Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1967, Ser. No. 639,889
Claims priority, application Japan, May 26, 1966, 41/33985, 41/33986, 41/33987
Int. Cl. G03g *13/22*
U.S. Cl. 96—1 17 Claims



The present invention provides an electrophotographic printing process comprising the steps of forming a first radiation energy pattern on an electrophotosensitive material without previously imparting a charge thereon, to form a latent electrical image on the electrophotosensitive material, forming a second radiation energy pattern to control the latent image, and thereafter causing the latent image to become visible by developing it with a charged, fine particle developer.

3,615,384

ELECTROPHOTOGRAPHIC PROCESS EMPLOYING VINYL BITHIOPHENE POLYMERIC PHOTOCONDUCTORS

Edward Gipstein, and William A. Hewett, both of Saratoga, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 29, 1970, Ser. No. 50,970
Int. Cl. G03g *5/00*; H01l *13/00*; C08f *15/00*
U.S. Cl. 96—1 R 4 Claims

Photoconductors comprising vinyl bithiophene polymers and their use in electrophotographic processes.

3,615,385

PREPARATION OF PRINTING PLATES EMPLOYING ORGANIC POLYMERIZABLE PHOTOCONDUCTOR

Erwin Lind, Auringen ueber Wiesbaden, Germany, assignor to Kalle Aktiengesellschaft, Wiesbaden-Biebrich, Germany

Filed May 11, 1967, Ser. No. 637,639
Claims priority, application Germany, May 13, 1966, K 59245
Int. Cl. G03g 5/00; B41n 1/00, 5/00
U.S. Cl. 96—1 6 Claims

A process for the preparation of printing plates from electrophotographic reproduction material, having a support suitable for printing purposes and a photoconductive layer thereon, by charging, imagewise exposure to light, developing the latent electrostatic image on the layer with a finely divided toner, subsequent heating, and removal of the photoconductive layer in the nonimage areas. The latent electrostatic image is produced on a layer which contains at least one known polymerizable organic photoconductor containing or forming during heating olefinic double bonds, and the image is made visible by means of a developer which, at least partially, consists of one or more finely divided solid substances forming radicals when heated. The reproduction material with the developed image thereon is heated to a temperature between 50° and 300° C., preferably to a temperature between 100° and 200° C., and finally the organic photoconductive layer is removed, in known manner, in the nonimage areas by dissolving it away.

3,615,386

ELECTROCONDUCTIVE ETHYLENE POLYMERS FOR USE IN ELECTROGRAPHIC RECORDING MEDIA

Bert H. Clampitt, Overland Park, Kans., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed June 25, 1969, Ser. No. 836,657
Int. Cl. G03g 5/10
U.S. Cl. 96—1 R 4 Claims

Ethylene polymers containing pendant alkali metal carboxylate units are employed as a medium for the conductance of electrical charges. Papers coated with such ethylene polymers have particular application in electrographic printing processes.

3,615,387

STRIPPABLE LAYER RELIEF IMAGING PROCESS

Lester Corrsin, Penfield, and Joan R. Ewing, Rochester, both of N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Filed May 8, 1962, Ser. No. 193,129
Int. Cl. B41m 5/20
U.S. Cl. 96—1.1 6 Claims

Thermoplastic deformation images are produced by xerographically deforming softenable films temporarily overcoated on conventional xerographic sensitive members. By the use of appropriate support layers for the softenable films, the deformed films can be readily separated from the sensitive member while preserving the image.

3,615,388

DEFORMATION IMAGING PROCESS AND ELEMENT

Robert W. Gundlach, 2434 Turk Hill Road, Victor, N.Y.

Filed May 8, 1962, Ser. No. 193,276
Int. Cl. B41m 5/18, 5/20; G03g 13/22
U.S. Cl. 96—1.1 24 Claims

Overcoated layer relief electrostatic printing in which a latent electrostatic image is made visible by the deformation of a compliant layer. The relief deformation occurs on a thermoplastic overcoating on conventional xerographic materials such as a conductive substrate which has been coated with a photoconductive insulating layer, said thermoplastic material overcoating said photoconductive layer. Methods and apparatus are disclosed for separable and permanent thermoplastic overcoatings on said xerographic plate. An interlayer between the thermoplastic overcoating and the photoconductive layer is included which serves as a nondeformable support and to protect the photoconductive layer from any interaction between the particular thermoplastic used and the solvent or heat used to initiate the thermoplastic action.

3,615,389

DIRECT IMAGE TRANSFER TO THERMOPLASTIC TAPE

Sterling P. Newberry, Schenectady, N.Y., assignor to General Electric Company

Filed Dec. 28, 1959, Ser. No. 862,249
Int. Cl. B41m 5/18, 5/20; G03n 15/22
U.S. Cl. 96—1.1 17 Claims

A method and system for thermoplastic recording involves the transfer of an electrostatic charge pattern from a photoconductive member to a deformable thermoplastic storage medium. Upon softening, the thermoplastic medium deforms in accordance with the electrostatic charge pattern. The information can be permanently retained by cooling the deformed thermoplastic. The retrieval of the information may be accomplished by the use of a Schlieren optical readout system.

3,615,390

METHOD OF PRODUCING A DIRECT POSITIVE PHOTOGRAPHIC RELIEF IMAGE EMPLOYING A PHOTOCONDUCTIVE-BINDER ELEMENT

Robert Hicks Sprague, Chelmsford, Mass., assignor to Itek Corporation, Lexington, Mass.

Filed Mar. 14, 1968, Ser. No. 713,022
Int. Cl. G03g 13/00
U.S. Cl. 96—1.2 8 Claims

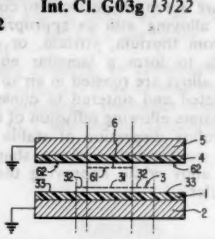
Methods are disclosed for making a direct positive photographic relief image and dye transfer prints therefrom by imagewise exposing an imaging medium comprising a photoconductor dispersed in a binder therefor, developing the medium with a developer depositing free metal in radiation-exposed areas, reoxidizing the free metal to metal ions in the presence of metal ion-activated softening agent for said binder, removing softened portions of the to produce said positive relief image, and, for preparing prints, taking up dye in remaining portions of the binder and transferring dye therefrom to a receptor sheet.

3,615,391

ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD

Satoru Honjo; Seiji Matsumoto, and Yasuo Tamai, all of Asaka-cho, Kita-Adachigun, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 3, 1968, Ser. No. 726,380
Claims priority, application Japan, May 30, 1967, 45723/67
Int. Cl. G03g 13/22
U.S. Cl. 96—1.2 8 Claims



An electrophotographic developing method for compensating an unwanted spectroabsorption in coloring agent wherein an electrostatic latent image in a color spectrum, and a second electrostatic latent image in another color spectrum corresponding to the unwanted absorption of the first electrostatic latent image are in opposition with a narrow gap in between. A coloring agent corresponding to the first latent image is fed into the gap and the amount of color agent selectively attached to the first electrostatic latent image is controlled by the second electrostatic latent image.

3,615,392

ELECTROPHOTOGRAPHIC REPRODUCTION OF ORIGINALS CONTAINING BOTH MULTICOLOR AND LINE AREAS

Satoru Honjo, Saitama, Japan, assignor to Xerox Corporation, Rochester, N.Y.

Filed Apr. 28, 1969, Ser. No. 820,019
Claims priority, application Japan, May 2, 1968, 43/29434
Int. Cl. G03g 13/22
U.S. Cl. 96—1.2 3 Claims

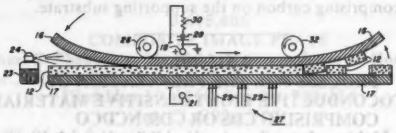
A multicolor imaging process is disclosed whereby an original document comprising both multicolor areas and monochrome or black and white line areas may be reliably reproduced.

3,615,393

MANIFOLD IMAGING PROCESS EMPLOYING STATIC CHARGE FIELD APPLICATION

Ivar T. Krohn; Geoffrey A. Page, and Gedeminas J. Reinis, all of Rochester, N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Continuation-in-part of application Ser. No. 609,057, Jan. 13, 1967, now abandoned. This application Feb. 28, 1969, Ser. No. 803,386
Int. Cl. G03g 13/22
U.S. Cl. 96—1.3 20 Claims



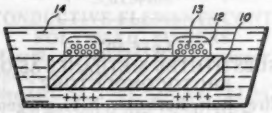
An imaging process wherein a cohesively weak electrically photosensitive imaging layer sandwiched between a donor sheet and a receiver sheet. The sandwich is subjected to an electric field which field is supplied by a static charge in at least one of the donor and receiver sheets. The imaging layer is exposed to imagewise electromagnetic radiation to which it is sensitive and upon separation of the donor and receiver sheet, the imaging layer fractures in imagewise configuration providing a negative image on one of the sheets and a positive image on the other.

3,615,394

METHOD OF FORMING A PIGMENT IMAGE FROM A PIGMENT-RESIN TONER IMAGE

William L. Goffe, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of application Ser. No. 570,924, Aug. 8, 1966, now abandoned. This application Apr. 28, 1970, Ser. No. 32,596
Int. Cl. G03g 13/22, 13/08, 13/16
U.S. Cl. 96—1.4 15 Claims



A method of forming a pigment image from a pigment-resin toner image by exposing the pigment-resin toner image to a solvent for the toner resin resulting in the resinous portion of the toner being dissolved away leaving a pigment image on the substrate.

3,615,395

ELECTROSTATIC AND ELECTROPHOTOGRAPHIC VARIABLE CONTRAST IMAGE-FORMING METHODS

Keizo Yamaji, and Masayoshi Ishihara, both of Tokyo, Japan, assignors to Canon Camera Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 25, 1967, Ser. No. 670,271
Claims priority, application Japan, Sept. 28, 1966, 41/64273
Int. Cl. G03g 13/14, 13/00
U.S. Cl. 96—1.4 15 Claims

A process for forming an electrostatic image in a plate having a photoconductive layer with an insulative overlayer wherein the insulative layer is charged in a first polarity, is then subjected to AC corona discharge while the photoconductive layer is exposed to a pattern of image radiation, and is then further charged with polarity opposite to said first polarity. The contrast of the formed electrostatic image may be adjusted by time-intensity characteristics of said further charging and exposure of the photoconductive layer to blanket radiation.

3,615,396

METHOD FOR THE PREPARATION OF MULTIPHASE HETEROGENEOUS PHOTOCONDUCTIVE COMPOSITIONS CONTAINING AT LEAST ONE PYRYLIUM DYE AND AN ELECTRICALLY INSULATING POLYMER

Eugene P. Gramza, and James M. Owens, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 16, 1969, Ser. No. 816,831
Int. Cl. G03g 5/00, 7/00
U.S. Cl. 96—1.6 14 Claims

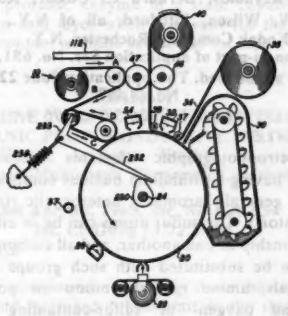
Multiphase heterogeneous compositions useful in electrophotography are formed from a combination in solution of at least one organic dye and an electrically insulating polymer. The dye is first dissolved in a solvent prior to addition of the polymer. The polymer is then stirred into the dye solution and the combined solution is coated on a support to form an electrophotographic layer. These heterogeneous compositions are useful as photoconductors or electrophotosensitizers and are characterized by a radiation absorption maximum that is substantially shifted from the absorption maximum of the dye and polymer when dissolved together to form a homogeneous composition.

3,615,397

METHOD OF CLEANING ELECTROSTATIC COPYING MACHINES

John A. Dimond, Pittsford, and Armistead Wharton, Henrietta, both of N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Division of Ser. No. 647,411, June 20, 1967, Pat. No. 3,526,457. Filed Nov. 5, 1969, Ser. No. 871,250
1969, Ser. No. 871,250
Int. Cl. G03g 13/14
U.S. Cl. 96—1.4 1 Claim



Method for cleaning the surface on which electrostatic latent images are formed and developed. A web of fibrous

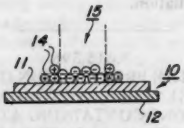
material is advanced in constant linear increments into rubbing contact with the surface to be cleaned. A combination of loops in the web path enables cleaning two surfaces simultaneously utilizing both sides of the web.

3,615,398

METHOD FOR ELECTROSTATIC COPYING INCLUDING AN IMPROVED PROCESS OF CLEANING THE PHOTOCONDUCTIVE SURFACE

John P. Caldwell, Fairport, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Dec. 11, 1969, Ser. No. 884,099
Int. Cl. G03g *13/14*
U.S. Cl. 96—1.4 R **3 Claims**



An improved method of producing xerographic copies which includes the steps of charging a photoconductive surface with an electrostatic charge, exposing the charged photoconductive surface to discharge portions of the charge in a configuration if image and nonimage areas corresponding to the copy to be reproduced, developing the photoconductive surface with electroscopic toner particles and transferring the toner particles from the photoconductive surface to a backing material. The improvement comprises simultaneously cleaning residual toner images from the drum surface and reuse of these residual toner images during development, then charging the developed photoconductive surface with a high-level corona having a polarity opposite from the charge on the toner particles overlying the image areas, contacting the image area toner particles with a backing material, then charging the backing material with a corona having a polarity opposite to the charge on the image toner particles to transfer the toner particles in image areas thereto and prepare the photoconductive surface for cleaning by development in the development zone.

3,615,399

ELECTROPHOTOGRAPHIC ELEMENTS CONTAINING DITHIOLIUM SALTS

George A. Reynolds; Bernard C. Cossar, Rochester, and Charles V. Wilson, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 681,928, Nov. 9, 1967, now abandoned. This application June 22, 1970, Ser. No. 48,467
Int. Cl. G03g *5/04, 5/06*
U.S. Cl. 96—1.5 **24 Claims**

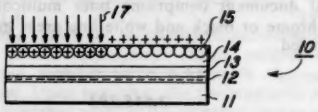
The electrophotographic elements contain sensitizer compounds having a dithiolium nucleus comprised of a five-membered, generally aromatic, heterocyclic ring containing two sulfur atoms. The sulfur atoms can be in either a 1,2- or a 1,3-relationship to one another, and all carbon atoms in the nucleus can be substituted with such groups as hydrogen, alkyl radicals, amino radicals, mono- or polycyclic aryl radicals and oxygen- or sulfur-containing heterocyclic radicals. Additionally, the dithiolium nucleus can form part of a fused ring aromatic structure with any or all of the rings being substituted with any of the above substituents.

3,615,400

MIGRATION IMAGING SYSTEM EMPLOYING A CARBON LAYER BETWEEN THE SOLVENT SOLUBLE LAYER AND THE CONDUCTIVE LAYER

Peter P. Augostini, Webster, and Mortimer Levy, Rochester, both of N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Filed Jan. 2, 1968, Ser. No. 694,906
Int. Cl. G03g *13/22, 5/06*
U.S. Cl. 96—1.5 **48 Claims**



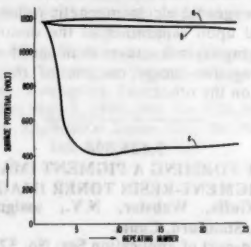
An imaging system wherein an imaging member comprising a supporting substrate, a layer of electrically conductive material, a layer comprising carbon, a softenable layer comprising solvent soluble softenable material contacting said layer comprising carbon, and a layer of particulate material comprising electrically photosensitive material embedded at the surface of said softenable material, is imaged in a migration imaging system wherein said member has an electrical latent image formed thereon and is first developed by contacting said member with a first solvent, and further developed by contacting with a second solvent to form an optically negative or optically positive image comprising carbon on the supporting substrate.

3,615,401

PROCESS FOR THE PREPARATION OF PHOTOCONDUCTIVE LIGHT-SENSITIVE MATERIALS COMPRISING CDS OR CDS. NCDCO

Katsuo Makino; Iwao Sawato; Yoshihiko Yamada, and Jun Onozaki, all of Odawara-shi, Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 3, 1969, Ser. No. 795,806
Claims priority, application Japan, Feb. 2, 1968, 6475/68
Int. Cl. G03g *5/08*
U.S. Cl. 96—1.5 **13 Claims**



Improved process for preparing photoconductive light-sensitive material wherein cadmium sulfide or cadmium sulfide/cadmium carbonate particles are dispersed in a resin binder, applied to a conductive support, and dried, the improvement comprising irradiating the dried photoconductive layer for a significant period of time.

3,615,402

TETRA-SUBSTITUTED METHANES AS ORGANIC PHOTOCONDUCTORS

Norman Geoffrey Rule, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 1, 1969, Ser. No. 862,960
Int. Cl. G03g *13/22, 5/06*
U.S. Cl. 96—1.5 **13 Claims**

Certain bis(N,N-dialkylaminoaryl)dialkylmethanes and gem-bis(N,Nldialkylaminoaryl)cycloalkanes are useful as photoconductors in electrophotographic elements.

3,615,403

INORGANIC SALT-RESIN CONDUCTIVE COATINGS FOR ELECTROPHOTOGRAPHIC PAPER

James K. J. Cheng, Vestal, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed Mar. 26, 1968, Ser. No. 715,995
Int. Cl. G03g *5/00, 7/00*
U.S. Cl. 96—1.5 5 Claims

Electrophotographic paper, having thereon conductive coatings applied from an aqueous coating composition containing an N-vinylpyrrolidone polymer, polyvinyl acetate emulsion and an inorganic salt—polyhydric alcohol system.

3,615,404

1,3-PHENYLENEDIAMINE CONTAINING PHOTOCONDUCTIVE MATERIALS

Lawrence Price, Old Orchard Beach, and John Alan Mattor, Hollis, both of Maine, assignors to The Scott Paper Company, Delaware County, Pa.

Filed Apr. 25, 1968, Ser. No. 724,224
Int. Cl. G03g *5/06*
U.S. Cl. 96—1.5 10 Claims

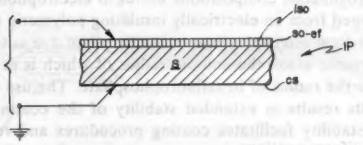
A new group of N,N,N′,N′-substituted-1,3-phenylenediamines and an electrophotographic material comprised of a slightly conductive support and an insulating coating thereon comprised of an insulating resin, and a N,N,N′,N′-substituted-1,3-phenylenediamine photoconductor. An electron-acceptor sensitizing agent can also be added to the insulating coating.

3,615,405

COMPOSITE IMAGE PLATE

Michael S. Shebanow, Medfield, Mass., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 10, 1968, Ser. No. 728,224
Int. Cl. G03g *5/00*
U.S. Cl. 96—1.5 5 Claims



An electrographic recording surface is provided by forming a porous metal oxide coating on a conductive substrate and then completely impregnating the oxide coating with an electrographic imaging material such that the imaging material is in contact with the conductive substrate.

3,615,406

PHOTOCONDUCTIVE ELEMENTS CONTAINING POLYMERIC BINDERS

Stewart H. Merrill, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1968, Ser. No. 772,362
Int. Cl. G03g *5/00;* C08g *19/00;* H01c *13/00*
U.S. Cl. 96—1.5 17 Claims

Photoconductive elements containing a photoconductor and a binder for the photoconductor comprising a poly(alkylidenebisaryloxyalkyl-co-alkylene terephthalate) are described. The described elements can be sensitized and charged either negatively or positively and used to prepare images electrophotographically.

3,615,407

METHOD OF TREATING A SINTERED PHOTOCONDUCTOR

Harvey A. Hodes, and Michael C. Zerner, both of Eatontown, N.J., assignors to The United States of America as represented by the Secretary of the Army

Filed Nov. 21, 1968, Ser. No. 777,918
Int. Cl. G03g *5/00;* H01c *13/00*
U.S. Cl. 96—1.5 4 Claims

A sintered photoconductor having increased photoconductivity is obtained by saturating a sintered photoconductor with a liquid dielectric.

3,615,408

POLYMERIC QUATERNARY DERIVATIVES OF 4-VINYL PYRIDINE IN ELECTRICALLY CONDUCTIVE PAPER

Charles M. Taubman, Cook County, Ill., assignor to De Soto, Inc., Des Plaines, Ill.

Filed Dec. 13, 1968, Ser. No. 783,742
Int. Cl. G03g *5/00;* D21h *1/10;* C09d *5/24*
U.S. Cl. 96—1.5 7 Claims

Quaternary polymers of 4-vinyl pyridine are used to render paper electrically conductive and therefore useful to receive photoconductive coatings to produce electrostatic copy paper.

3,615,409

ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING A PHOTOCONDUCTIVE PIGMENT OF GENERAL FORMULA $R_2N_4S_3$

Bernard Grushkin, Pittsford, N.Y., assignor to Zerox Corporation, Rochester, N.Y.

Filed Jan. 2, 1969, Ser. No. 789,062
Int. Cl. G03g *5/00*
U.S. Cl. 96—1.5 R 19 Claims

An electrophotographic plate including a photoconductive layer comprising a compound having the formula $R_2N_4S_3$ wherein R is a substituted or unsubstituted fluorenyl, anthryl, dibenzocycloheptenyl, or indenyl group is disclosed.

3,615,410

ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME

Satoru Honjo, Asaka-shi, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 28, 1969, Ser. No. 811,628
Claims priority, application Japan, Mar. 28, 1968, 43/20259
Int. Cl. G03g *5/00;* H01l *13/00;* C03c *1/00*
U.S. Cl. 96—1.5 6 Claims

An electrophotographic light-sensitive material wherein a photoconductive insulating layer comprises a finely powdered inorganic photoconductive compound and an insulating resinous binder, the surface of said insulating layer containing a protease enzyme in a state capable of being dissolved from said layer when a solvent for the enzyme is brought into contact with the surface of the layer.

3,615,411

BIANTHRONE COMPOUNDS AS SENSITIZERS FOR ORGANIC PHOTOCONDUCTIVE SYSTEMS

William J. Hessel, Arlington Heights, Ill., assignor to Addressograph-Multigraph Corporation, Mount Prospect, Ill.

Filed Apr. 30, 1969, Ser. No. 820,634
Int. Cl. G03g *13/22, 5/06*
U.S. Cl. 96—1.5 7 Claims

Bianthrone compounds including those having halogen, lower alkyl and hydrogen substituents in the ring structure, are used to sensitize organic photoconductive systems so that they will respond to electromagnetic radiation in the visible portion of the spectrum. Typical of the sensitizers that can be used are 2,2′-dibromobianthrone and bianthrone.

3,615,412

FLUORENE TYPE COMPOUNDS AS ORGANIC PHOTOCONDUCTORS

William J. Hessel, Arlington Heights, Ill., assignor to Addressograph-Multigraph Corporation, Mount Prospect, Ill.

Filed Apr. 30, 1969, Ser. No. 820,666
Int. Cl. G03g *13/22, 5/06*
U.S. Cl. 96—1.5 10 Claims

An organic photoconductor which is the compound fluorene and derivatives in which fluorene is fused with benzo and naphtho ring structures. The dibenzofluorenes and fluorenes are dispersed in suitable resin binders over the range of 1–100 parts by weight to 10 parts binder and applied to a conductive substrate.

3,615,413

INDIUM DOPING OF SELENIUM-ARSENIC PHOTOCONDUCTIVE ALLOYS

Carl B. Fisher, Mendon, and Lloyd A. Relyea, Webster, assignors to Xerox Corporation, Rochester, all, N.Y.

Filed June 23, 1969, Ser. No. 835,699
Int. Cl. G03g *13/22, 5/02*
U.S. Cl. 96—1.5 16 Claims

A xerographic plate having a novel photoconductive layer comprising a vitreous selenium-arsenic alloy containing indium in an amount sufficient to enhance the electrical characteristics of the plate.

3,615,414

PHOTOCONDUCTIVE COMPOSITIONS AND ELEMENTS AND METHOD OF PREPARATION

William A. Light, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 586,820, Oct. 14, 1966, now abandoned, Continuation-in-part of application Ser. No. 674,005, Oct. 9, 1967, now abandoned. This application Mar. 4, 1969, Ser. No. 804,266
Int. Cl. G03g *7/00*; H01l *13/00*; C08g *51/04*
U.S. Cl. 96—1.6 26 Claims

Multiphase heterogeneous compositions are formed from an organic dye and electrically insulating polymeric material. A solution of dye and polymer is prepared and subsequently treated, for example, by exposure of a coating thereof to a solvent to form the heterogeneous compositions. These compositions which are useful as photoconductors or electrophotosensitizers are characterized by a radiation absorption maximum that is substantially shifted from the absorption maximum of the dye dissolved in the polymer to form a homogeneous composition. Particularly useful dyes are the pyrylium dyes.

3,615,415

METHOD FOR THE PREPARATION OF PHOTOCONDUCTIVE COMPOSITIONS

Eugene P. Gramza, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 586,648, Oct. 14, 1966, now abandoned, and a continuation-in-part of 674,006, Oct. 9, 1967, now abandoned. This application May 2, 1969, Ser. No. 821,513
Int. Cl. G03c *5/06*
U.S. Cl. 96—1.6 12 Claims

Multiphase heterogeneous compositions are formed from an organic dye and electrically insulating polymeric material. A solution of dye and polymer is prepared and subsequently subjected to high speed shearing. Electrophotographic layers can be prepared by coating the sheared solution to form the multiphase heterogeneous compositions. Such compositions which are useful as photoconductors or electrophotosensitizers are characterized by a radiation absorption maximum that is substantially shifted from the absorption maximum of a simple, untreated solution of dye dissolved in polymer.

3,615,416

9,10-SUBSTITUTED ACRIDINES AS SENSITIZERS IN ELECTROPHOTOGRAPHIC SYSTEMS

Charles J. Fox, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed June 5, 1969, Ser. No. 830,862
Int. Cl. G03g *5/06, 5/08*
U.S. Cl. 96—1.6 14 Claims

9,10-substituted acridine compounds are useful as sensitizers for photoconductive compositions in electrophotographic systems.

3,615,417

SPECTRAL SENSITIZATION OF LIGHT-SENSITIVE ELEMENTS USING CYANINE DYES

Guy Alfred Rillaers, Kontich, and Henri Depoorter, Mortsel, both of Belgium, assignors to Gevaert-Agfa N.V., Mortsel, Belgium

Filed June 17, 1969, Ser. No. 834,169
Claims priority, application Great Britain, July 5, 1968, 32,351/68
Int. Cl. G03g *5/00*
U.S. Cl. 96—1.6 8 Claims

A silver halide or inorganic photoconductor is spectrally sensitized with a cyanine dye comprising two hetro-cyclic nitrogen-containing ring systems linked by a conjugated methine group.

3,615,418

HETEROGENEOUS DYE-BINDER PHOTOCONDUCTIVE COMPOSITIONS

William J. Staudenmayer, Pittsford, and James C. Fleming, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed June 20, 1969, Ser. No. 835,223
Int. Cl. G03g *5/06*
U.S. Cl. 96—1.6 13 Claims

Heterogeneous compositions useful in electrophotography are formed from an electrically insulating polymeric material and pyrylium selenapyrylium or thiapyrylium dye salts having an inorganic anion the anionic radius of which is at least as large as the radius of hexafluorophosphate. The use of these dye salts results in extended stability of the coating dopes which stability facilitates coating procedures and results in more uniform coatings.

3,615,419

PHOTOCONDUCTIVE COATING SYSTEMS

Stanley Field, Piscataway, N.J., assignor to National Starch and Chemical Corporation, New York, N.Y.

Filed June 13, 1968, Ser. No. 736,591
Int. Cl. G03g *5/08*
U.S. Cl. 96—1.8 7 Claims

A photoconductive coating for application to a solid substrate which is to be utilized in electrophotographic operations, said coating comprising a layer of zinc oxide pigment bonded with a blend of a vinyl acetate polymer and a styrene-maleic anhydride copolymer.

3,615,420

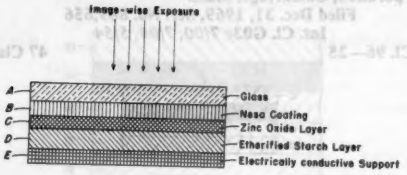
ELECTROPHOTOGRAPHIC PROCESS AND ELEMENT EMPLOYING A CONDUCTIVE LAYER OF ETHERIFIED STARCH OR CELLULOSE

Albert S. Deutsch, New York, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed Dec. 12, 1968, Ser. No. 785,050
Int. Cl. G03g *5/00*; B44c *1/04*
U.S. Cl. 96—1.8 7 Claims

A process of visible image formation which comprises exposing a photoconductor layer having a high dark

resistivity to electromagnetic radiation having a wavelength extending from the ultraviolet through the visible region said photoconductor layer being dispersed in electrically conducting contact with a layer comprising etherified starch



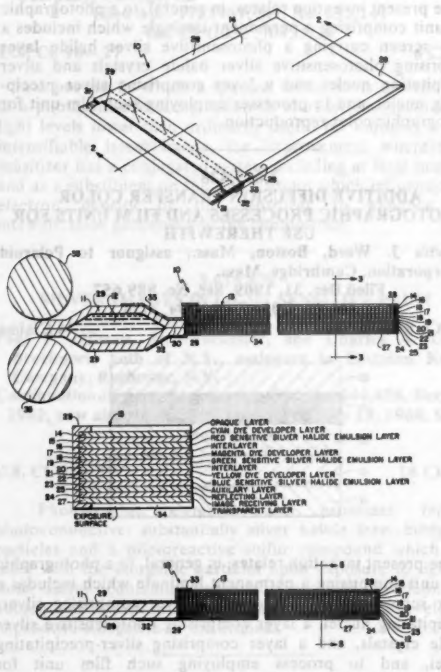
or cellulose, as for example, hydroxyalkyl starch or alkoxycellulose, or unsymmetrical ethers of the form R–O–R_1 wherein R and R_1 are alkyl or aryl groups having at least one substituent which is of electron-withdrawing character.

3,615,421

NOVEL PHOTOGRAPHIC PRODUCTS AND PROCESSES

Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed July 31, 1969, Ser. No. 846,441
Int. Cl. G03c *7/00, 1/40, 5/54*
U.S. Cl. 96—3 **42 Claims**



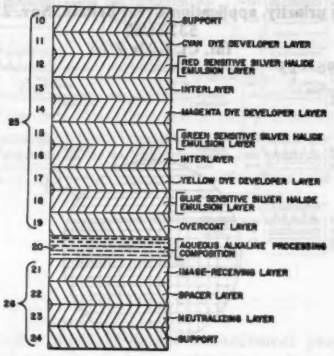
The application is directed, in general, to an integral negative/positive color diffusion transfer process film unit which includes, in order, an opaque layer, a photosensitive silver halide emulsion layer having associated dye transfer image-forming material, a layer comprising a visible light-reflecting agent in a concentration insufficient to prevent exposure of the silver halide emulsion by radiation incident on the layer, a polymeric layer dyeable by the dye transfer image-forming material, a transparent layer, and a rupturable container adapted to distribute retained processing composition between the dyeable layer and the silver halide emulsion layer, and to specified diffusion transfer color process employing such a film unit.

3,615,422

PHOTOGRAPHIC PRODUCTS AND PROCESSES

Richard J. Haberlin, Weston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of application Ser. No. 486,862, Sept. 13, 1965, now abandoned, which is a continuation-in-part of application Ser. No. 450,305, Apr. 23, 1965, now abandoned. This application Sept. 2, 1969, Ser. No. 854,491
Int. Cl. G03c *7/00, 5/54, 1/40*
U.S. Cl. 96—3 **32 Claims**



Diffusion transfer photographic products comprising a support carrying at least two selectively sensitized silver halide emulsion layers, each having a dye which is a silver halide developing agent of predetermined color associated therewith, and a layer intermediate the emulsion layers comprising a processing solution permeable and hydratable metal-free synthetic polymer which is permeable to dye image-forming materials substantially only in the hydrated state.

3,615,423

THERMOCOPYING

Marcel Nicolas Vrancken, Hove, Belgium, assignor to Gevaert-Agfa, N.V., Mortsel, Belgium

Filed Oct. 24, 1967, Ser. No. 677,764
Claims priority, application Great Britain, Oct. 24, 1966, 47627/66
Int. Cl. G03c *7/16, 5/04*
U.S. Cl. 96—13 **17 Claims**

A dispersion of solid hydrophobic thermoplastic polymer particles in a continuous phase of a hydrophilic binder on a support is imagewise exposed to heat. An aqueous solution of a colorant is diffused through the hydrophilic areas of the dispersion layer which were not exposed to heat and the support is imagewise colored.

3,615,424

COLOR OSCILLOGRAPH RECORDING PAPER

Carl E. Johnson, and Dewey M. Dumers, both of Binghamton, N.Y., assignors to GAF Corporation, New York, N.Y.

Filed Apr. 25, 1966, Ser. No. 544,812
Int. Cl. G03c *7/16, 1/76, 3/00*
U.S. Cl. 96—22 **6 Claims**

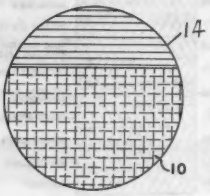
Light-sensitive multicolor recording paper for oscillograph traces, having on a support, an undercoat of green-sensitive gelatin-silver bromoiodide emulsion in which the iodine amounts to 0.2–2.0 mol percent of the silver and containing a magenta color former, a gelatin interlayer, an overlying blue-sensitive gelatin-silver bromoiodide emulsion in which the iodine is 4–12 mol percent of the silver content and containing cyan color former, and a gelatin surface coating.

By using yellow and magenta filters of different density for the exposing light and subjecting the material to color development, at least three different color traces can be produced.

3,615,425
METHOD OF MAKING A COLOR PHOTOGRAPHIC PRINT FROM A COLOR TRANSPARENCY, OR THE LIKE

Keith Aston, Cheam, England, assignor to The Pavelle Corporation, New York, N.Y.

Filed Nov. 21, 1968, Ser. No. 777,828
Claims priority, application Great Britain, Nov. 22, 1967, 53224/67
Int. Cl. G03c 7/16
U.S. Cl. 96—23 4 Claims

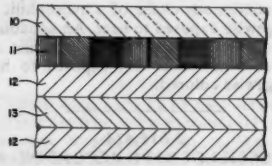


The present invention involves a system for balancing the colors used in making colored photographic prints where the speed of the printing material is substantially greater for one color than for another. According to the invention a portion of the beam for printing the most rapid color components is reduced by suitable masking or filtering and exposure of the beam of that color component is automatically terminated. The color components of the entire illuminating beam are mixed so that exposure is made from the single mixed beam.

3,615,426
ADDITIVE DIFFUSION TRANSFER COLOR PHOTOGRAPHIC PROCESSES AND FILM UNITS FOR USE THEREWITH

Frank E. Debruyn, Jr., Whitman, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 31, 1969, Ser. No. 889,636
Int. Cl. G03c 7/00, 7/04, 5/54
U.S. Cl. 96—25 44 Claims

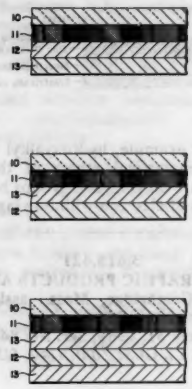


The present invention relates, in general, to a photographic film unit comprising a permanent laminate which includes a color screen carrying, in order, a first layer comprising silver precipitating nuclei and photosensitive silver halide crystals, a second layer comprising silver precipitating nuclei, and a third layer comprising silver precipitating nuclei and photosensitive silver halide crystals, and to processes employing such film unit for photographic color reproduction.

3,615,427
ADDITIVE DIFFUSION TRANSFER COLOR PHOTOGRAPHIC PROCESSES AND FILM UNITS FOR USE THEREWITH

Frank E. Debruyn, Jr., Whitman, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 31, 1969, Ser. No. 889,656
Int. Cl. G03c 7/00, 7/04, 5/54
U.S. Cl. 96—25 47 Claims

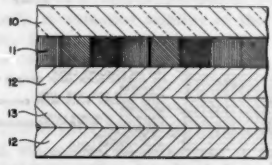


The present invention relates, in general, to a photographic film unit comprising a permanent laminate which includes a color screen carrying a photosensitive silver halide layer comprising photosensitive silver halide crystals and silver precipitating nuclei and a layer comprising silver precipitating nuclei, and to processes employing such film unit for photographic color reproduction.

3,615,428
ADDITIVE DIFFUSION TRANSFER COLOR PHOTOGRAPHIC PROCESSES AND FILM UNITS FOR USE THEREWITH

Lucretia J. Weed, Boston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 31, 1969, Ser. No. 889,657
Int. Cl. G03c 7/00, 7/04, 5/54
U.S. Cl. 96—25 44 Claims



The present invention relates, in general, to a photographic film unit comprising a permanent laminate which includes a color screen carrying, in order, a layer comprising silver-precipitating nuclei, a layer comprising photosensitive silver halide crystals, and a layer comprising silver-precipitating nuclei, and to process employing such film unit for photographic color reproduction.

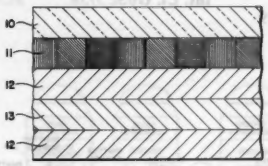
3,615,429
ADDITIVE DIFFUSION-TRANSFER COLOR PHOTOGRAPHIC PROCESSES AND FILM UNITS FOR USE THEREWITH

Lucretia J. Weed, Boston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 31, 1969, Ser. No. 889,660
Int. Cl. G03c 7/00, 7/04, 5/54
U.S. Cl. 96—25 44 Claims

The present invention relates, in general, to a photographic film unit comprising a permanent laminate which includes a

color screen carrying, in order, a layer comprising photosensitive silver halide crystals, a layer comprising silver



precipitating nuclei, and a layer comprising photosensitive silver halide crystals, and to processes employing such film unit for photographic color reproduction.

3,615,430

IMAGE INTENSIFICATION FOR SENSITIZED FILMS

Peter Bruck, Encino, and Nancy Gershman Adin, San Gabriel, both of Calif., assignors to Bell & Howell Company, Chicago, Ill.

Filed Apr. 17, 1967, Ser. No. 631,141
Int. Cl. G03c *5/04, 5/24*
U.S. Cl. 96—27 **6 Claims**

In a process in which a spectral sensitizer is incorporated in a photosensitive composition to increase its sensitivity to light levels lower than ordinarily useful for inducing a light intensifiable latent image, the improvement wherein the sensitizer has a conjugated system including at least one ring and as a substituent on the ring a group which influences the electron density of the sensitizer to enhance the intensification propensity of the composition.

3,615,431

SILVER IMAGES IN LIGHT SENSITIVE PRINT FORMING LAYERS

Paul B. Gilman, Jr., Rochester, and Charles A. Goffe, Brockport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 244,456, Dec. 13, 1962, now abandoned. This application July 15, 1968, Ser. No. 744,733
Int. Cl. G03c *5/04, 5/24*
U.S. Cl. 96—27 **16 Claims**

Photographic elements and processes feature photoconductive, substantially silver halide free, inorganic particles and a photoreactive sulfur compound which will react with the inorganic particles upon exposure to light to form sulfur containing sites for physical development. Subsequent to exposure, the element is physically developed to produce a negative of the original.

3,615,432

ENERGY-SENSITIVE SYSTEMS

Philip W. Jenkins; Donald W. Heseltine, and John D. Mee, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 9, 1968, Ser. No. 766,307
Int. Cl. G03c *1/72, 1/12, 1/24*
U.S. Cl. 96—27 **46 Claims**

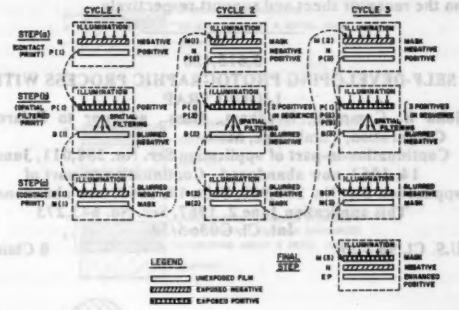
A class of energy-sensitive compounds containing heterocyclic nitrogen atoms substituted with an–OR group fragment under the influence of various forms of energy to form a dye base, a proton and an aldehyde, these materials being useful in image reproduction.

3,615,433

FEEDBACK IMAGE ENHANCEMENT PROCESS

George A. Biernson, Concord; Raymond Euling, Sudbury, and Paul W. Jones, Franklin, all of Mass., assignors to Sylvania Electric Products Inc.

Filed Oct. 29, 1968, Ser. No. 771,585
Int. Cl. G03c *5/04*
U.S. Cl. 96—27 **16 Claims**



A reiterative feedback image enhancement process for enhancing the details of photographic images. In accordance with a preferred embodiment of the invention, the feedback image enhancement process comprises three successive cycles of three successive steps (*a*), (*b*), and (*c*), followed by a final operation. In step (*a*) of the first cycle, a positive image is derived from an original negative image of a scene, in step (*b*) a blurred negative image is produced from the positive image, and in step (*c*) a mask image is produced from the blurred negative image. In each of the second and third cycles, a positive image is produced in step (*a*) from the original negative image and the mask image produced in the previous cycle, a blurred negative image is produced in step (*b*), and a mask image is produced in step (*c*). In the final operation, an enhanced positive image is produced from the original negative image and the mask image produced in the third cycle.

3,615,434

PHOTOSENSITIVE ELEMENT AND PROCESS EMPLOYING A LIGHT-SENSITIVE MUCONIC ACID POLYESTER

Robert C. McConkey; Thomas M. Laakso, and Cornelius C. Unruh, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 4, 1968, Ser. No. 773,322
Int. Cl. G03c *11/12;* **G03f** *7/10*
U.S. Cl. 96—28 **13 Claims**

Polyesters prepared from a muconic acid and a diol are photosensitive and are useful in photographic processes including photothermographic transfer processes.

3,615,435

PHOTOHARDENABLE IMAGE REPRODUCTION ELEMENT WITH INTEGRAL PIGMENTED LAYER AND PROCESS FOR USE

Victor Fu-Hua Chu, Wilmington, Del., and Abraham Bernard Cohen, Springfield, N.J., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 12, 1968, Ser. No. 775,123
Int. Cl. G03c *1/68, 11/12*
U.S. Cl. 96—28 **13 Claims**

A photohardenable image reproduction element comprising, in order, a support, a layer of clear photohardenable material, and a layer of colored photohardenable material. On imagewise exposure, a latent image is produced comprising selectively photohardened material in both layers. This image is developed by

transferring the underexposed areas to a separate image receptive surface.

The element may have additionally an integral receptor sheet of a material selected according to end use considerations. This element is developed by stripping apart the support and receptor sheets. Cohesive failure occurs in the underexposed areas of the clear photohardenable layer and adhesive failure at the image receptor-photohardened interface of the exposed areas. Sharply defined positive and negative images with low stain are simultaneously produced on the receptor sheet and support respectively.

3,615,436

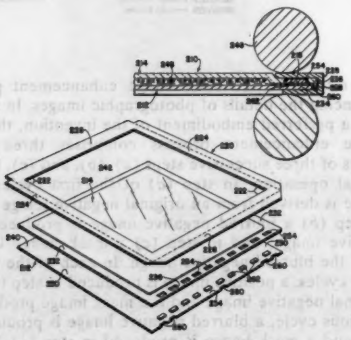
SELF-DEVELOPING PHOTOGRAPHIC PROCESS WITH LIQUID TRAP

John E. Campbell, Needham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of application Ser. No. 288,011, June 14, 1963, now abandoned , Continuation-in-part of application Ser. No. 309,968, Sept. 19, 1963, now abandoned. This application June 2, 1967, Ser. No. 643,273

Int. Cl. G03c *5/54*

U.S. Cl. 96—29 **8 Claims**



A photographic film assemblage comprising a pair of sheetlike elements, one of which includes a photosensitive area adapted to be exposed and processed by an alkaline processing liquid distributed in a layer between the two elements to form a visible transfer image. The film assemblage includes means defining a liquid trapping and retaining space near one edge of the area adapted to be exposed, for collecting and retaining excess processing liquid, and liquid permeable means impregnated with an acid located in the trapping and retaining space for neutralizing the excess processing liquid collected therein. In a preferred film structure and method, the two sheets are retained together during and subsequent to processing, one of the sheets is transparent to provide for viewing an image formed between the sheets and the liquid trapping and retaining space is located between the sheets very close to the area containing the visible image.

3,615,437

LITHOGRAPHIC PRINTING PLATES

Peter Charles Richardson, and Peter John Hillson, both of Wealdstone, Harrow, England, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 2, 1968, Ser. No. 694,847

Claims priority, application Great Britain, Jan. 5, 1967, 740/67

Int. Cl. G03c *5/54*; **G03f** *7/02*

U.S. Cl. 96—29 L **13 Claims**

Lithographic printing plates and methods for the preparation thereof wherein an oleophilic metal, e.g. copper, overlayer is selectively electrodeposited on image areas formed by silver salt diffusion transfer on a hydrophilic metal, e.g. aluminum, base. Press life of the metal baseplates is significantly increased by the deposition of the overlayer.

3,615,438

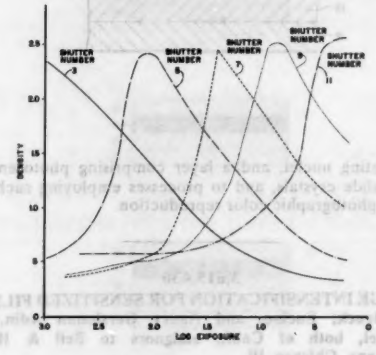
PHOTOGRAPHIC PROCESSES, COMPOSITIONS AND PRODUCTS

Edwin H. Land, Cambridge; Meroe M. Morse, Boston, and Leonard C. Farney, Melrose, all of Mass.

Filed June 13, 1968, Ser. No. 736,821

Int. Cl. G03c *5/54*

U.S. Cl. 96—29 **43 Claims**



Development solubilization photographic processes are disclosed wherein silver halide is preferentially dissolved from developing silver halide grains. Processing compositions employed in such processes include at least one silver halide complexing agent capable of forming a soluble silver complex, and preferably contains a second silver halide complexing agent capable of forming a less soluble silver complex. The dissolved silver halide may be transferred to another stratum to provide a visible image, preferably a silver transfer image which is a negative image of the photographed subject matter.

3,615,439

PHOTOGRAPHIC COMPOSITIONS AND PROCESSES-B

Edwin N. Oftedahl, Jr., Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 1, 1968, Ser. No. 764,301

Int. Cl. G03c *5/30*

U.S. Cl. 96—29 **13 Claims**

Photographic developing agents which are lactone derivatives, such as coumarin derivatives, and especially 6-hydroxy coumarin and/or 6-amino coumarin derivatives, and, which have the property of forming a lactone developing agent precursor under neutral, slightly alkaline and acid conditions, provide less stain without loss of desired sensitometric properties in diffusion transfer systems. These are especially suitable in combination with other photographic developing agents. Corresponding developing agent precursors are also suitable in diffusion transfer systems. Stabilization processing systems can also employ these developing agents and/or developing agent precursors.

3,615,440

NOVEL PHOTOGRAPHIC COMPOSITIONS AND PROCESSES

Stanley M. Bloom, Waban, and Richard D. Cramer, Cambridge, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 25, 1968, Ser. No. 770,822

Int. Cl. G03c *5/30*, *5/54*

U.S. Cl. 96—29 **9 Claims**

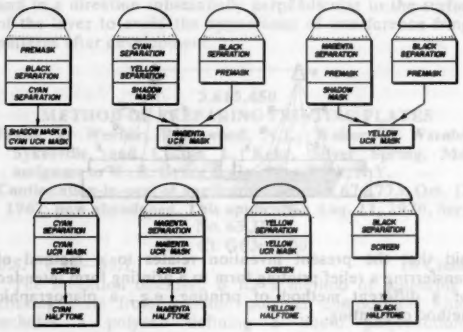
Substituted reductic acid compounds and preferably, tetrasubstituted reductic acid compounds are used as developing agents for silver halide emulsions in photographic processes, particularly diffusion transfer processes.

3,615,441

COLOR CORRECTION BY MASKING FOR A FOUR-COLOR PRINTING PROCESS

Alan L. Deneau, 317 Moran, Grosse Pointe Farms, Mich.

Filed Mar. 30, 1970, Ser. No. 23,891
Int. Cl. G03f 3/00
U.S. Cl. 96—30 5 Claims



For use in the four-color printing process, individual masks are made for preparation of the cyan, magenta and yellow halftones. Each mask achieves both undercolor removal and all of the required color correction. A dual purpose shadow mask and cyan undercolor removal mask is prepared by exposure through the premask, black separation and cyan separation. The magenta undercolor removal mask is made by two separate exposures: a color correction exposure through the cyan and yellow separations and shadow mask; and an undercolor removal exposure through the black separation and premask. The yellow undercolor removal mask is also made by two separate exposures: a color correction exposure through the magenta separation, premask and shadow mask; and an undercolor removal exposure through the black separation and premask.

3,615,442

METAL PRINTING PLATE AND METHOD FOR PREPARATION OF SAME

Frank T. Geris, Naperville, Ill., and John W. Krueger, Cottage Grove, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation-in-part of application Ser. No. 372,715, June 4, 1964, now abandoned, Continuation-in-part of application Ser. No. 421,070, Dec. 24, 1964, now abandoned. This application Mar. 21, 1968, Ser. No. 715,094
Int. Cl. G03f 7/02; G03c 5/00, 1/71
U.S. Cl. 96—33 37 Claims

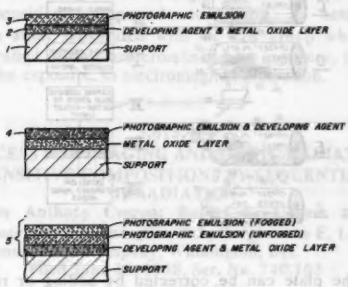
A metal printing plate and method for preparation of same wherein the metal is selected from the group consisting of copper, zinc, aluminum, iron, brass, silver, tin, lead, magnesium, stainless steel, chromium, manganese, nickel and alloys thereof and in which the metal is presensitized with a light sensitive diazo material which is applied to the metal surface of the plate in a manner to provide for direct contact with the metal for reaction to form a stabilized light sensitive diazotized coating which permits imaging by photo techniques to produce an imaged plate and which preferably is etched by an electrical or chemical etch after exposure to produce a deep etched lithographic plate or gravure plate from which many copies can be produced and in which stabilization is achieved by mechanically working, abrading or immersing the plate surface with the light sensitive diazo resin solution and which includes treatment for controlling the degree of polymerization of the light sensitive diazo resin in the coating for control of subsequent image development.

3,615,443

PRESENSITIZED PLANOGRAPHIC PRINTING PLATE

James G. Smith, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 3, 1967, Ser. No. 635,757
Int. Cl. G03f 7/02
U.S. Cl. 96—33 22 Claims



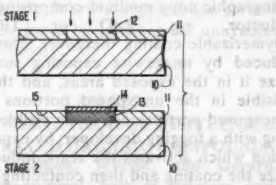
A presensitized printing plate comprising a support, a hardened gelatin photographic silver halide emulsion layer, a developer-containing layer and a reflecting layer between the emulsion and the support which contains a metal oxide and has certain Reflectance characteristics. The emulsion can be a direct-positive one and can optionally contain a halogen-accepting compound and a sulfonated compound to increase sensitivity.

3,615,444

COLOR COUPLER AS OLEOPHILLIC FORMING AGENT IN LITHOGRAPHIC PROCESS

Kinji Ohkubo, and Takashi Nakamura, both of Kanagawa, Japan, assignors to Fuji Photo Film Company Ltd., Kanagawa, Japan

Filed July 10, 1967, Ser. No. 652,303
Claims priority, application Japan, July 11, 1966, 41/45258
Int. Cl. G03f 7/02
U.S. Cl. 96—33 30 Claims



A process for preparing a lithographic printing master by exposing a lithographic printing plate having a silver halide light-sensitive layer containing a nontanning agent and an oleophilic image-forming agent, and processing the layer to provide an oleophilic property to the exposed areas.

One or both of the additives may be incorporated in the processing bath.

3,615,445

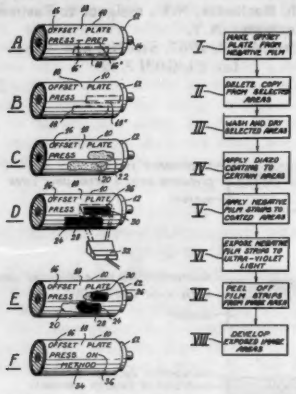
METHOD OF CORRECTING OFFSET PRINTING PLATES

Alice Elizabeth Powell, 445 W. 49th St. Apt. 2A, New York, N.Y.

Filed July 27, 1967, Ser. No. 656,468
Int. Cl. G03c 7/02; C11d 7/08
U.S. Cl. 96—33 1 Claim

The disclosure describes a method of correcting an offset

printing plate after it is completed and mounted on a printing press. The plate can be corrected by adding or removing copy impressions in selected areas.

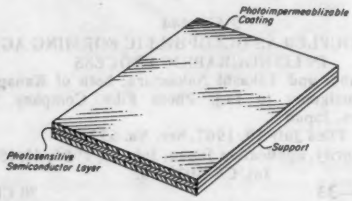


3,615,446

PHOTOGRAPHIC COPY MEDIUM COMPRISING A SEMICONDUCTOR LAYER WITH A PHOTOPOLYMERIZABLE LAYER THEREOVER

Hans K. Wong, Arlington, Mass., assignor to Itek Corporation, Lexington, Mass.

Filed Jan. 15, 1968, Ser. No. 697,948
Int. Cl. G03f 7/02; G03c 5/00
U.S. Cl. 96—33 **12 Claims**



A photographic copy medium comprising a photosensitive semiconductor, e.g. ZnO or TiO_2 having a photopolymerizable coating thereover. Photographic images are produced by imagewise exposing such a medium to polymerize it in the exposed areas, and then rendering the image visible in the unexposed portions of the medium. These unexposed portions are made visible by, for example, contacting with a fogging developer; by exposing the medium to radiation which activates the semiconductor but does not polymerize the coating and then contacting the medium with image-forming materials reactive with the activated semiconductor areas; or by first removing the unexposed, unpolymerized portions of the coating, then uniformly exposing the medium to radiation capable of activating the semiconductor, and then contacting it with image-forming materials. A medium having a coating over the photopolymer coating comprising a heat-sensitive composition which forms oleophilic-hydrophilic images upon imagewise application of heat is also disclosed.

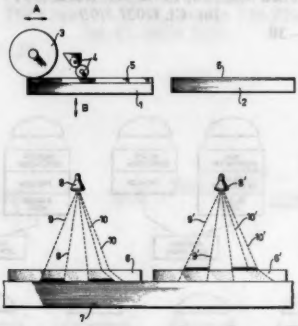
3,615,447

METHOD OF MAKING PRINTING PLATES

Poul H. Kongstad, Ljunggatan 39, Furulund, Sweden

Filed June 12, 1968, Ser. No. 736,431
Claims priority, application Sweden, June 12, 1967, 8254/67
Int. Cl. G03f 7/02; G03b 27/02
U.S. Cl. 96—33 **4 Claims**

The present invention relates to a method of transferring a printing image from a relief printing form to a light sensitive photographically developable printing plate, printing cylinder, or any other printing means, or a material intended for making such a printing means. Alternatively, it may be said that the present invention relates to a method of transferring a relief printing form to a printing form intended for a different method of printing, e.g., a planographic method of printing.



3,615,448

LITHOGRAPHIC PRINTING PLATE AND METHOD OF PREPARATION

Leon Yeshin, Montreal, Quebec, Canada, assignor to W. R. Grace & Co, New York, N.Y.

Filed Jan. 14, 1969, Ser. No. 791,167
Int. Cl. G03f 7/02
U.S. Cl. 96—33 **23 Claims**

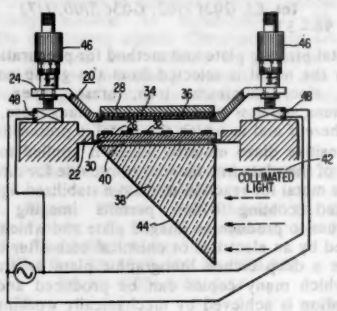
A lithographic (planographic) printing plate is prepared from an element comprising a layer of a photocurable composition containing finely divided particles of a vinyl plastic. The layer is exposed imagewise to U.V. radiation, which photocures the photocurable composition, and then is uniformly heat fluxed, whereby the photocurable composition plasticizes the plastic vinyl in the nonexposed areas. The imagewise exposure is through a stencil, or a negative or positive transparency (halftone or line.) The exposed areas are either oleophilic or hydrophilic in relation to the nonexposed areas. The homopolymer of vinyl chloride is the preferred vinyl plastic.

3,615,449

METHOD OF GENERATING HIGH AREA-DENSITY PERIODIC ARRAYS BY DIFFRACTION IMAGING

David Leslie Greenaway, Bassersdorf, Switzerland, assignor to RCA Corporation

Filed Sept. 25, 1969, Ser. No. 860,865
Int. Cl. G03c 5/00; G02b 5/18
U.S. Cl. 96—35 **15 Claims**



High area-density arrays, such as diode array vidicon camera tube targets and electron tube electrode screens, are

made by photolithographic printing utilizing a photomask diffraction image rather than a photomask shadow for exposing a photoresist masking layer. To form the masking layer, a relatively flat photoresist layer is exposed to a periodic array diffraction image from a photomask. The exposed portions of the layer are removed, leaving an array of unexposed portions. Alternatively, the unexposed portions of the layer may be removed, leaving an array of exposed portions. During the exposure, the layer is oscillated over a distance of essentially one-quarter the wavelength of the light and in a direction substantially perpendicular to the surface of the layer to avoid the appearance of interference fringe patterns after development.

3,615,450

METHOD OF PREPARING PRINTING PLATES

Frank X. Werber, Ridgewood, N.J.; Walter R. Wszolek, Sykesville, and Clifton L. Kehr, Silver Spring, Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of application Ser. No. 674,773, Oct. 12, 1967, now abandoned. This application Aug. 11, 1970, Ser. No. 63,312

Int. Cl. G03c 5/00

U.S. Cl. 96—35.1 18 Claims

The invention disclosed is for a method of preparing a printing plate from a liquid polymer composition which includes a polyene defining a liquid polyfunctional component having molecules containing at least two reactive ethylenically or acetylenically unsaturated carbon-to-carbon bonds per molecule, and a liquid polythiol component having molecules containing at least two thiol groups per molecule, with the total functionality of the polyene and polythiol components being greater than four. Optionally, a photocuring rate accelerator is also included in the liquid polymer composition. The photocurable liquid polymer composition may be selectively insolubilized by actinic light to form a solid elastomeric or resinous printing plate.

3,615,451

PRINTING PLATE HAVING A PHOTOACTIVE LAYER

Ernst-August Hackmann, Wiesbaden-Dotzheim, Germany, assignor to Kalle Aktiengesellschaft, Wiesbaden-Biebrich, Germany

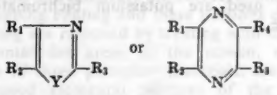
Filed Aug. 28, 1968, Ser. No. 755,828

Claims priority, application Germany, Aug. 31, 1967, P 15 97 785.2

Int. Cl. G03c 1/70

U.S. Cl. 96—35.1 13 Claims

This invention relates to a light-sensitive material, particularly a printing plate having a photopolymerizable layer, which layer contains a photochemically initiatable organic halogen compound and a compound corresponding to one of the following general formulas:



wherein

R_1 and R_2 which may be identical or not, are aryl or heteroyl groups which may be substituted, or form members of an aromatic or pyridine ring,

R_3 is $-CH=CH_2$ or $-RCH=CH_2$, with R being arylene, naphthalene, or heteroylene,

R_4 is either identical with R_3, or is an aryl or heteroyl group which may be substituted, and

Y is NH, S, Se, or O.

3,615,452

DYE-SENSITIZED PHOTOPOLYMERIZATION PROCESS

Edward J. Cerwonka, Binghamton, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed Sept. 9, 1968, Ser. No. 758,632

Int. Cl. G03c 1/70

U.S. Cl. 96—35.1 15 Claims

A dye-sensitized photopolymerization process for vinyl monomers wherein said vinyl monomers are polymerized by means of a diazonium compound and a dye by a photo-oxidation process.

3,615,453

CROSSLINKABLE POLYMER COMPOSITIONS

Philip W. Jenkins; Donald W. Heseltine, and John D. Mee, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 9, 1968, Ser. No. 766,288

Int. Cl. G03c 1/68

U.S. Cl. 96—35.1 29 Claims

Polymers having hardenable groups and incorporating an energy-sensitive compound containing a heterocyclic nitrogen atom substituted with an -OR group where R is alkyl, aralkyl or acyl are crosslinked by exposure, including imagewise exposure, to electromagnetic radiation.

3,615,454

PROCESS FOR IMAGING AND FIXING RADIATION-SENSITIVE COMPOSITIONS BY SEQUENTIAL IRRADIATION

Lawrence Anthony Cescon; Robert L. Cohen, and Rolf Dessauer, all of Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed June 26, 1968, Ser. No. 740,103

Int. Cl. G03c 5/24

U.S. Cl. 96—35.1 27 Claims

A multiple irradiation method which comprises providing a radiation-sensitive material comprising (1) a radiation-sensitive, multicomponent, intermolecularly reactive imageable composition whose imaging reaction is subject to diffusion control, mixed with (2) a radiation-sensitive polymerizable composition, imaging by irradiating with imaging radiation under imaging conditions, and deactivating the imageable composition in the unexposed areas by irradiating with the polymerizing radiation under nonimaging conditions, said polymerization being effective to rigidify the material so as to render the imaging reaction diffusion-controlled and thereby prevent the imaging components from diffusing together and reacting.

In the imaging step it is only necessary that the imaging reaction occur before the polymerization reaction can deactivate the system. In the deactivation (or fixing) step it is only necessary that the deactivating radiation be applied under conditions ineffective for imaging.

Imagewise exposing the composition first to the imaging radiation then to the deactivating radiation produces a negative image. On the other hand, imagewise exposing the composition first to the deactivating radiation creates a latent image, which is developed by exposing the unirradiated areas to the imaging radiation.

3,615,455

PHOTOPOLYMERIZATION OF ETHYLENICALLY UNSATURATED ORGANIC COMPOUNDS

Urbain Leopold Laridon, Wilrijk, and Gerard Albert Delzenne, 'S-Gravenwezel, both of Belgium, assignors to Gevaert-Agfa N. V., Mortsel, Belgium

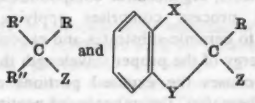
Filed Nov. 27, 1968, Ser. No. 779,625

Claims priority, application Great Britain, Jan. 12, 1968, 1952/68

Int. Cl. C08f 1/20

U.S. Cl. 96—35.1 8 Claims

The photopolymerization of ethylenically unsaturated organic compounds in the presence of a diacylhalomethane photopolymerization initiator having the structural formulas:



wherein:

Z represents chlorine or bromine,

R represents hydrogen, chlorine, bromine or acetyloxy,

R' and R" represent benzoyl, nitrobenzoyl,dimethylaminobenzoyl, phenylsulfonyl, carboxyphenylsulfonyl, methylphenylsulfonyl, or naphthoyl,
X and Y represent carbonyl or sulfonyl

is described. Exposure times for the polymerization is substantially reduced permitting use of low-intensity radiation.

3,615,456

PROCESS FOR PHOTOIMAGING CERTAIN POLYMERIC SUBSTANCES CONTAINING PIGMENTS

Jennie Lee Touchette, and Arthur D. Ketley, both of Silver Spring, Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Jan. 8, 1969, Ser. No. 789,754
Int. Cl. G03c 5/00, 1/68
U.S. Cl. 96—35.1 17 Claims

A process for photoimaging polymeric layers of certain halogen-containing vinylogous resins and halogen-free metallic components is disclosed. The process typically includes assembling a unit which is made up of a polymeric layer and a translucent layer. A liquid media is placed between the two layers and is most frequently sealed around the edges to prevent the escape of the liquid from between the two layers. The translucent layer can be either translucent or transparent. The translucent layer can typically be a thin layer of poly(ethylene terephthalate). An image-bearing layer is exposed to ultraviolet radiation. After a period of time of exposure, preferably of not greater than about 20 minutes, a complete image which corresponds to the ultraviolet radiation passing through the image-bearing layer is formed in the polymeric layer. The image-bearing layer can be an ordinary silver negative, etc. The liquid media is preferably a solution of 50 parts by weight ethanol and 50 parts by weight glycerine. The halogen-containing vinylogous resin is capable of being readily dehydrohalogenated to a visibly different unsaturated polymer having at least 5 conjugate double bonds. The vinylogous resin can be poly (vinyl chloride acetate). The metallic component, zinc oxide, is quite desirable because it, usually, serves as a good background contrast to the colored image which is formed upon the exposure of the polymeric layer.

3,615,457

PHOTOPOLYMERIZABLE COMPOSITIONS AND PROCESSES OF APPLYING THE SAME

Michael Seibert, Philadelphia, Pa., and Lawrence G. Vaughan, Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 2, 1969, Ser. No. 822,793
Int. Cl. G03c 5/00, 1/68
U.S. Cl. 96—35.1 16 Claims

The photopolymerizable compositions contain organic noble metal compounds, photopolymerizable monomers, organic sensitizers, organosulfur compounds and, optionally, a flux. The process comprises applying these novel compositions to ceramic substrates and exposing the films to ultraviolet energy of the proper wavelength through negative masks. This causes the exposed portions of the film to harden, and thereafter, the unhardened portions of the films are removed with a suitable solvent. Then the entire ceramic assembly is fired to produce fine line noble metal patterns having high resolution.

3,615,458

PHOTOSENSITIVE HEXAVALENT CHROMIUM COMPOUND CONTAINING POLYVINYL ALCOHOL COMPOSITION AND METHOD OF USING

Rinse Dykstra, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 12, 1968, Ser. No. 744,409The portion of the term of the patent subsequent to June 29, 1988, has been disclaimed.
Int. Cl. G03c 1/66, 5/22
U.S. Cl. 96—36 5 Claims

Photosensitive lacquer having a pH of between 6.7 and 8.2 and containing polyvinyl alcohol, a light sensitive chromium compound for hardening the alcohol, a dipolar aprotic substance. The lacquer layers may be dried at temperatures up to about 100° C. without causing hardening of the polyvinyl alcohol.

The invention relates to a photosensitive lacquer which consists of a solution in water of polyvinyl alcohol (PVA) in which a hexavalant chromium compound is present, to a method of preparing such lacquers, and to their use in manufacturing patterns according to a photomechanical method.

The photosensitive lacquers which are known as such and which consist of a solution of polyvinyl alcohol in which a compound is present containing a hexavalent chromium, are used in various sectors of technology, for example, in manufacturing lithographic plates for offset printing, in which the photohardened layer serves as an ink-absorbing layer, in manufacturing printed circuits in which the photohardened layer serves as an etching resist and in manufacturing picture screens for cathode-ray tubes in which a pattern of substances luminescing upon excitation by electrons is provided on the screen with a photosensitive lacquer.

In all these methods the quality of the photosensitive lacquer is very important. The quality is determined inter alia by the shelf life of the photolacquer, the photosensitivity of layers obtained with the photolacquer, and the extent to which the so-called dark reaction in a layer obtained with the photolacquer can occur and which may give rise to hardening of the lacquer on nonexposed, thus undesired, places. The photosensitive lacquers commonly used in the art and consisting of a solution in water of polyvinyl alcohol usually contain ammonium bichromate or ammonium chromate, which latter compound, on drying the lacquer layer, is converted into ammonium dichromate, while ammonia (NH_3) volatilizes. Other bichromates which are sometimes used are potassium bichromate and sodium bichromate.

3,615,459

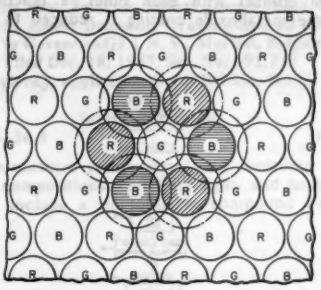
METHOD OF SCREENING A COLOR IMAGE REPRODUCER

Sam H. Kaplan, Chicago, Ill., assignor to Zenith Radio Corporation

Filed Nov. 6, 1968, Ser. No. 773,833
Int. Cl. H01j 9/22
U.S. Cl. 96—36.1 6 Claims

The faceplate section of a tricolor cathode-ray tube of the shadow mask type is coated with a photosensitive layer and is exposed through the shadow mask from positions of the light source that represent two of the three colors. For example, in screening the green phosphor, the exposure is made with the light source positioned to simulate the red and the blue electron guns. The exposure interval is extended so that the unexposed elemental areas of the screen, the areas to receive the green phosphor, are made smaller in size than the apertures of the shadow mask, this control of size taking

advantage of the penumbra effect. Thereafter, the unexposed elemental areas of the screen are developed in green



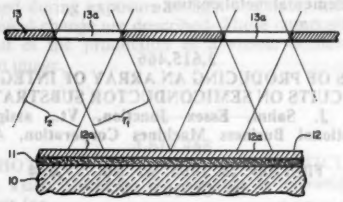
phosphor. In similar fashion, the screen is coated with red and blue phosphor materials.

3,615,460

METHOD OF FORMING A BLACK SURROUND SCREEN

Howard G. Lange, Arlington Heights, Ill., assignor to Zenith Radio Corporation

Filed Nov. 6, 1968, Ser. No. 773,831
Int. Cl. H01j *1/54, 9/22*
U.S. Cl. 96—36.1 7 Claims



The screen of a shadow mask type of tricolor picture tube is coated with a light-absorbing layer comprising a composition of a black inorganic pigment material, an acrylic binder and a solvent therefor, specifically toluene. After drying, this layer is overcoated with polyvinyl alcohol and dichromate in water as a solvent and the overcoat is exposed by ultraviolet light, leaving unexposed elemental areas of dot shape. The overcoat is treated with water which removes the unexposed portions and uncovers the corresponding portions of the light-absorbing coating and these portions of the last-mentioned coating are removed by treating with toluene. As a result, elemental dot areas of the screen, which are assigned to one of three phosphor materials, are now laid bare. The exposed elemental portions of the polyvinyl alcohol coating are stripped and all the process steps, except for forming the light-absorbing layer, are repeated two more times, preparing additional elemental screen areas to receive phosphor deposits. The three phosphor materials are then applied in conventional manner.

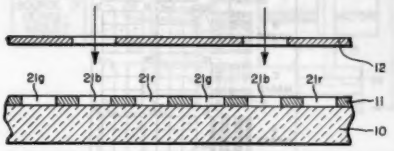
3,615,461

METHOD OF PROCESSING A BLACK SURROUND SCREEN

Sam H. Kaplan, Chicago, Ill., assignor to Zenith Radio Corporation

Filed Nov. 6, 1968, Ser. No. 773,830
Int. Cl. H01j *1/54, 9/22*
U.S. Cl. 96—36.1 4 Claims

The faceplate of a color cathode-ray tube is covered with a layer of sensitized polyvinyl alcohol and is exposed through the shadow mask of the tube to establish images of the elemental areas of the screen that are to receive deposits of phosphor. These images are developed by treating the screen with water which removes the unexposed portions of the layer and then the screen is baked to render the images opaque to actinic radiation. The screen next receives a second coating of a similar photosensitive material including a pigment having light-absorbing capabilities. Exposing the screen from the surface opposite that which has been coated



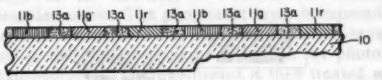
and treating with the solvent of the second layer washes away the portions of that layer which overlie the opaque dot images. Thereafter, phosphor is deposited on assigned series of the dot images and a final baking step removes the polyvinyl alcohol, leaving on the screen phosphor dot deposits individually surrounded by light-absorbing pigment.

3,615,462

PROCESSING BLACK-SURROUND SCREENS

Constantin S. Szegho, and Sam H. Kaplan, both of Chicago, Ill., assignors to Zenith Radio Corporation

Filed Nov. 6, 1968, Ser. No. 773,832
Int Cl. H01j *1/54, 9/22*
U.S. Cl. 96—36.1 3 Claims



The faceplate of a color cathode-ray tube is covered with a sensitized aqueous solution of polyvinyl alcohol (PVA) and exposed through the shadow mask to establish dot images in the selected elemental areas of the screen that are to receive phosphor materials. These images are developed by washing the screen with water to remove the unexposed portions of PVA and then the screen is baked to render the dot images opaque to actinic radiation. Thereafter, the screen is coated with a similar photosensitive material including a light-absorbing pigment and is exposed from the side opposite that which has been coated. Washing with water removes all portions of the second layer which overlie the opaque PVA dot images, confining the pigment to the portions of the screen which surround the dot images. Thereafter, a thin film of a sensitized aqueous solution of PVA is applied to the faceplate and subjected to a flooding beam of ultraviolet light to render the film insoluble in water and form a surface hardened coating over the pigment to lock it securely against erosion. Following this, three sets of deposits of different color phosphors are applied over the developed dot images after which the faceplate is ultimately baked out.

3,615,463

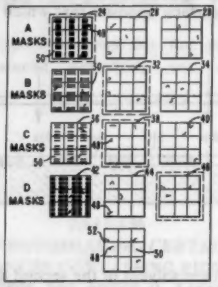
PROCESS OF PRODUCING AN ARRAY OF INTEGRATED CIRCUITS ON SEMICONDUCTOR SUBSTRATE

William N. Kuschell, Burlington, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 19, 1968, Ser. No. 777,012
Int. Cl. G03c *5/04*
U.S. Cl. 96—36.2 11 Claims

Mask matching in semiconductor manufacturing processes wherein a plurality of masks are used for different processing steps to expose photoresist in arrays of patterns for semiconductor circuits on a wafer may be accomplished very rapidly on a sequential step basis. This may be done by selecting a mask for one of the process steps, then selecting masks one step at a time for the remaining steps by comparing the defect pattern in masks for the step being

selected with the defect pattern of the masks previously selected, then selecting the mask for the step which will add



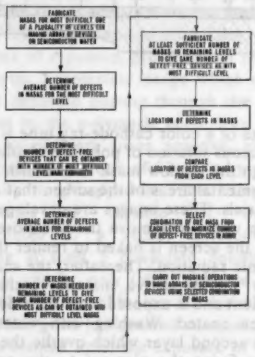
the fewest number of additional defective integrated circuits in the array.

3,615,464

PROCESS OF PRODUCING AN ARRAY OF INTEGRATED CIRCUITS ON SEMICONDUCTOR SUBSTRATE

Benjamin Agusta, Burlington, and Ravinder J. Sahni, Essex Junction, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 19, 1968, Ser. No. 777,013
Int. Cl. G03c *5/04*
U.S. Cl. 96—36.2 **7 Claims**



The relative number of masks required in different levels in a mask matching process used for different processing steps to expose photoresist in arrays of patterns for semiconductor circuits on a wafer may be determined on the basis of the average number of random defects in the mask levels. This provides a way to decrease the number of comparisons that need to e made in a mask matching process without lowering the increased yield of defect-free patterns on the substrate obtained through mask matching.

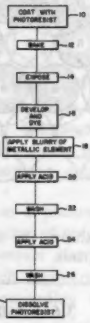
3,615,465

PHOTOETCHING OF METAL-OXIDE LAYERS

Hans B. Bullinger, Peabody, Mass., assignor to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed June 13, 1969, Ser. No. 833,049
Int. Cl. G03c *5/00*
U.S. Cl. 96—36.2 **5 Claims**

Techniques for the selective removal of conductive coatings from nonconductive base materials are disclosed. The invention contemplates the use of conventional photofabrication techniques to expose precisely defined regions of a coating, typically a metal-oxide, which are to be removed followed by the application of a metallic element and water and an acid. After the metal-oxide coating, the slurry of the metallic element and water and the acid are brought in contact with each other, a reaction occurs whereby the metal-oxide coating is reduced to elemental



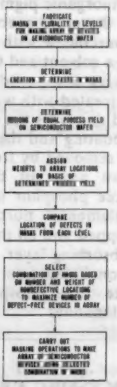
metal. The reaction is allowed to continue for a short time only whereby the elemental metal is but superficially attacked and is followed by an acid wash to remove the exposed elemental metal coating.

3,615,466

PROCESS OF PRODUCING AN ARRAY OF INTEGRATED CIRCUITS ON SEMICONDUCTOR SUBSTRATE

Ravinder J. Sahni, Essex Junction, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 19, 1968, Ser. No. 777,014
Int. Cl. G03c *5/04*
U.S. Cl. 96—36.2 **6 Claims**



Defect-free integrated circuit patterns in masks which are overlayed by a mask matching process used for different processing steps to expose photoresist in arrays of patterns for semiconductor circuits on a wafer may be weighted prior to matching in accordance with different process yield regions of the array. Weighting the defect-free patterns in this manner provides a way of concentrating the defect-free locations in the masks in the high process yield regions of the wafer.

3,615,467

PHOTOLYSABLE COMPOUNDS AND THEIR USES IN PHOTOGRAPHIC PROCESSES

Albert Lucien Poot, Kontich; Robert Joseph Pollet, Berchem, and Gerard Albert Delzenne, Gravenwezel, all of Belgium, assignors to Gevaert-AGFA N. V., Mortsel, Belgium

Filed Dec. 18, 1967, Ser. No. 691,213
Claims priority, application Great Britain, Jan. 3, 1967, 361/67
Int. Cl. G03c *5/00*
U.S. Cl. 96—36.3 **10 Claims**

Radiation-sensitive compositions and recording materials containing compositions which are light- and heat-sensitive and which include a photolysable compound having the formula:

wherein:

each of X, Y, and Z is an acyl radical, cyano, nitro, azido, a carbamyl group, a sulphamyl group, or wherein X and Y are joined to form a nucleus containing two strong electron-withdrawing groups, either of them attached to the carbon atom having the Z substituent, and

R is hydrogen, azido, an alkyl radical, an aryl radical, or a heterocyclic radical,

and a substance which, under the influence of radicals formed during exposure to light and heat, undergoes a chemical change are described. These compositions are useful in the production of a visible or developable latent image.

3,615,468

PHOTOPRINTING PROCESS AND ARTICLE

Lauri D. Tiala, Towanda, Pa., assignor to Sylvania Electric Products Inc.

Filed Nov. 6, 1968, Ser. No. 773,972
Int. Cl. G03f *7/00*
U.S. Cl. 96—36.3 **4 Claims**

A photographic master is disclosed wherein the master comprises a base, a pattern, a protective coating and a plurality of protrusions that provide a gas escapement means when the master is used to provide a pattern upon a metallic sheet in a contact printing process. An improved process and a new composition for providing the protective coating and the protrusions are also disclosed.

3,615,469

POLYMERIC PRINTING PLATES

Floyd L. Ramp, West Richfield, Ohio, assignor to The B. F. Goodrich Company, New York, N.Y.

Filed June 2, 1969, Ser. No. 837,987
Int. Cl. G03c *5/00*
U.S. Cl. 96—36.3 **19 Claims**

A method for producing etched rubber products for use in printing wherein cured rubber products formed from diolefin polymer compounds are treated with aromatic nitrocompounds, masked and exposed to light to selectively degrade the exposed areas. The degraded material is removed leaving the unexposed area as a raised surface.

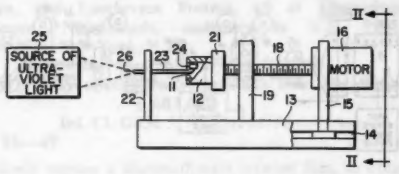
3,615,470

FABRICATION OF HELICAL PATTERNS ON CYLINDRICAL SURFACES

June Singletary, Jr., Raleigh, N.C., assignor to Corning Glass Works, Corning, N.Y.

Filed Sept. 20, 1967, Ser. No. 669,114
Int. Cl. G03c *5/00*
U.S. Cl. 96—37 **2 Claims**

A method and apparatus are disclosed for forming a pattern by a photoresist technique on a surface which does not readily lend itself to exposure by light from a photographic negative. This method is particularly useful for



the formation of patterns on nonplanar surfaces and surfaces which are not easily accessible, such as the inner surface of a hollow cylinder.

3,615,471

METHOD FOR MAKING OPTICAL MASKS

Jean Paul Lenoble, Paris; Bertrand Jacques Albert, Blanc Mesne; Francois G. Bochard, Fontainebleau; Jacques A. Coquard, Paris, and Roger A. Norture, Boissy Saint Leger, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 12, 1968, Ser. No. 751,908
Claims priority, application France, Aug. 16, 1967, 8645AM
Int. Cl. G03c *5/00, 11/00*
U.S. Cl. 96—38.3 **10 Claims**

A method of producing optical masks by coating one surface of a transparent plate with a photoresist layer containing, as an additive, a catalyst for subsequent electroless deposition. The photoresist layer is exposed to a light pattern which activates the conventional sensitizer contained in the photoresist layer to harden the photoresist in the exposed areas. The photoresist is then treated with a developer which removes the unexposed, unhardened areas, leaving a pattern corresponding to the light pattern of photoresist containing a catalyst for electroless deposition. The substrate is then treated with a conventional electroless deposition bath which selectively deposits the metal in the areas coated with the photoresist pattern.

3,615,472

HIGH-SPEED PHOTOGRAPHIC EMULSION AND METHOD OF USING SAME

Robert Cone, 599 River Road, Piermont, N.Y.

Filed Feb. 10, 1969, Ser. No. 804,046
Int. Cl. G03c *5/00*
U.S. Cl. 96—36.4 **2 Claims**

A projection-speed silver bromide emulsion of washed type and containing by weight of the silver nitrate used in making the emulsion of an organic antifoggant in excess of 1.5 percent, a retarder consisting of a crystalline quaternary ammonium salt such as di-isobutyl phenoxy (or cresoxy) ethoxy ethyl dimethyl benzyl ammonium chloride monohydrate of approximately 0.1 percent (which also serves as a germicide), and a hardener ranging between 0.04 and 0.15 of the total weight of the gelatin in the emulsion.

3,615,473

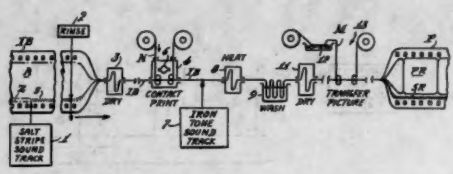
DIAZO PROCESS OF FORMING INFRARED ABSORBING RECORD

John M. Andreas, Pasadena, Calif., assignor to Technicolor, Inc., Hollywood, Calif.

Filed Nov. 4, 1969, Ser. No. 873,886
Int. Cl. G03c *5/14, 5/18, 5/34*
U.S. Cl. 96—39 **20 Claims**

A nonsilver soundtrack is formed on a transparent blank motion picture imbibition film by striping the longitudinal soundtrack zone only with a photosensitive diazosalt. The sensitized track is then printed from s silver soundtrack to form a latent image. The soundtrack zone only is then developed with an iron blue forming toner to produce an iron blue soundtrack record which is absorbtive of infrared light

universally used to excite the photocell of commercial motion picture projectors. The three-color aspects of a color



motion picture are then transferred by imbibition to the picture area beside the soundtrack.

3,615,474

METHOD OF MAKING A GRID LAYOUT FOR PRINTED CIRCUITRY

Rudy D. Rosenberger, 54 Franklin Ave., Souderton, Pa.

Filed Mar. 8, 1968, Ser. No. 711,693
Int. Cl. G03c 5/04
U.S. Cl. 96—41 4 Claims

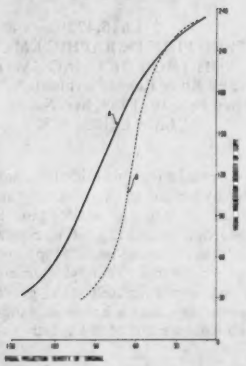
A method of making a dotted-line grid layout for printed circuitry is disclosed. A solid-line grid is photographically reproduced to obtain a positive which is then used to prepare a negative wherein the grid is of dotted lines. Thereafter, the dotted-line grid negative is combined with a layout negative. The combined negatives are then photographically reproduced and thereafter circuitry may be simulated by application of tape on the dotted-line grid.

3,615,475

PHOTOGRAPHIC ELEMENTS AND PROCESS FOR PRODUCING VESICULAR IMAGES

Eugene R. Skarvinko, Binghamton, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 14, 1968, Ser. No. 713,002
Int. Cl. G03c 5/04, 5/18, 1/54
U.S. Cl. 96—41 16 Claims



A photographic element for producing vesicular images having extended latitudes and low gradations comprising two or more superimposed layers, each comprising a binder material and a photosensitive compound capable of decomposing upon exposure to light to form gas wherein each of said binder materials has a different permeability to gas.

A process for producing vesicular images having extended latitudes and low gradations comprising imagewise exposing the above-described photographic elements to light to decompose the photosensitive compounds and heating the element to develop the vesicular images.

3,615,476

METHOD FOR RECORDING AND REPRODUCING INFORMATION BY SURFACE DEFORMATION OF A POLYMERIC COMPOSITION

Paul Maria Cassiers, Mortsel-Antwerpen; Andre Jan Conix, Antwerpen, and Gerard Albert Delzenne, Wilrijk-Antwerpen, all of Belgium, assignors to Gevaert-AGFA N.V., Mortsel, Belgium

Continuation of application Ser. No. 553,716, May 31, 1966, now abandoned.
Int. Cl. G03c 1/70
U.S. Cl. 96—49 7 Claims

A process is described for recording and reproducing information comprising the steps of imagewise exposing a recording layer comprising a polymeric composition which is photochemically hardenable to actinic light and treating the exposed layer with heat and/or a vapor containing a solvent for said polymeric composition during which treatment the polymeric composition is softened but without removal of any substantial part of the treated element. Upon allowing the treated layer to cool and/or absorbed solvent to volatilize a direct visual image in the light exposed portion of the layer is obtained as a result of the light scattering property in the irradiated portions. The resultant recording layer can be used in a manner similar to conventional photoresists, printing plates and the like.

3,615,477

PHOTOSENSITIVE MATERIAL COMPRISING A FURFURYLIDENE, A LOWER HALOALKANE AND A 2,5-DIALKOXYANILINE

John A. Mattor, Bar Mills, Maine, assignor to Scott Paper Company, Delaware County, Pa.

Filed Jan. 5, 1970, Ser. No. 819
Int. Cl. G03c 5/24, 1/72
U.S. Cl. 96—48 10 Claims

A heat developable photographic plate which comprises, on a support, a layer of a binder containing dissolved therein: as a color former, a furfurylidene compound; as a sensitizer, a lower haloalkane; and as an enhancer, a 2,5-dialkoxyaniline; and which is capable of forming, after exposure to light, dense, black images at temperatures in excess of 150° C.

3,615,478

METHOD OF FIXING PHOTOGRAPHIC MATERIAL CONTAINING A FREE RADIAL PRODUCING COMPOUND

Schoichiro Hoshino; Akira Kato, and Kotaro Yabe, all of Tokyo, Japan, assignors to Keuffel & Esser Company, Hoboken, N.J.

Filed Mar. 15, 1967, Ser. No. 623,234
Claims priority, application Japan, Mar. 18, 1966, 41/16711
Int. Cl. G03c 5/24
U.S. Cl. 96—48 6 Claims

Light-sensitive photographic material comprising a light-sensitive generator of free radicals and a color modifier capable of showing a visible color change by the action of such free radical is fixed against photolytic color change by contact with a salt of hydrogen sulfide or a salt of a sulfur-containing oxygen acid.

3,615,479

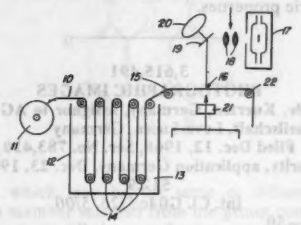
AUTOMATIC FILM PROCESSING METHOD AND APPARATUS THEREFOR

Robert J. Kohler, Alexandria, Va., and Jerry G. Hughes, Waltham, Mass., assignors to Itek Corporation, Lexington, Mass.

Filed May 27, 1968, Ser. No. 732,141
Int. Cl. G03c 5/24, 1/72
U.S. Cl. 96—48 18 Claims

Selective region development of photographic film is made

by relating density of the photographic emulsion with the intensity of an infrared beam directed onto the emulsion and



by controlling the intensity as a function of the density. Apparatus for carrying out the method is provided.

3,615,480

DEVELOPER SOLUTIONS FOR PHOTOPOLYMERIZED LAYERS

Frank Man-Kam Lam, East Brunswick, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 24, 1969, Ser. No. 801,740
Int. Cl. G03c 5/24
U.S. Cl. 96—48 6 Claims

An aqueous developer comprising an alkali metal silicate having a silica to alkali metal oxide ratio greater than 1.5 and one or more water-miscible organic solvents having a pH of 10.0–13.0 and capable of removing all the unexposed areas of a photopolymerizable layer containing an ethylenically unsaturated monomer of a printing form.

3,615,481

LEUCO DYE/HEXAARYLBIIMIDAZOLE THERMALLY ACTIVATED IMAGING PROCESS

Catharine E. Looney, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed May 19, 1969, Ser. No. 825,966
Int. Cl. G03c 5/24
U.S. Cl. 96—48 10 Claims

Process for imaging photosensitive color-forming compositions comprising selected leuco dyes, hexaarylbiimidazoles, and, optionally, a binder, which process comprises heating said composition to a temperature at which the composition becomes sufficiently fluid to permit fluid movement of the components of the composition, but below the decomposition temperature of the composition, and subjecting the composition to photoirradiation with activating light within the ultraviolet and visible regions. Preferably the binder is a thermoplastic polymer having a glass transition temperature above room temperature but below the decomposition temperature of the composition. In the alternative, the steps of the process may be reversed, i.e., the irradiation step may be carried out first, followed by heating as described above.

3,615,482

GELABLE PHOTOPROCESSING SOLUTIONS

Alvin Cronig, Shaker Heights, Ohio, assignor to Itek Corporation, Lexington, Mass.

Continuation-in-part of application Ser. No. 757,114, Sept. 3, 1968, now abandoned. This application Dec. 17, 1969, Ser. No. 885,991
Int. Cl. G03c 5/24, 5/38
U.S. Cl. 96—48 12 Claims

Gelable photoprocessing solutions are disclosed which comprise a photoprocessing solution and an amount of heat-reversible gel-forming carrageenan or furcellaran sufficient to cause gelation of the solution. These solutions are easily gelled, in which state they are useful in developing, fixing, washing, etc. exposed photographic films.

3,615,483

METHOD OF PHOTOGRAPHICALLY PRODUCING COPPER METAL IMAGES

Hendrik Jonker; Casper Johannes Gerardus Ferdinand Janssen, and Lambertus Postma, all of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 16, 1967, Ser. No. 623,568
Claims priority, application Netherlands, Mar. 19, 1966, 6,603,640
Int. Cl. G03c 5/34, 1/62, 1/56
U.S. Cl. 96—49 2 Claims

Selectively expose a diazosulfonate treated film, to obtain free sulfite, treat exposed layer with silver salt to form silver sulfite, reduce the silver sulfite to form a silver nuclei image and treat silver nuclei image with a solution of a copper metal such as nickel, cobalt or silver salt and a reducing agent therefore to form a metal image formed of said metal.

3,615,484

TWO-COMPONENT DIAZO-TYPE PHOTOPRINTING MATERIAL FOR USE IN WET DEVELOPMENT

Shigeaki Yoshida, Kanagawa-ken, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan

Filed Dec. 6, 1967, Ser. No. 688,374
Claims priority, application Japan, Dec. 26, 1966, 41/85061
Int. Cl. G03c 1/58
U.S. Cl. 96—49 7 Claims

A two-component diazo-type photoprinting material which is developed with an alkaline aqueous solution containing no coupler, said photoprinting material comprising a supporting sheet and a light-sensitive layer provided on one face of said supporting sheet, said light-sensitive layer containing at least one aromatic diazo compounds and a coupler consisting of at least one aromatic compound adapted to couple to said diazo compound, said coupler being used with the ratio of 0.5–1.5 mols to 1 mol of said diazo compound.

3,615,485

DIAZO-TYPE DEVELOPERS

Rafiqul Islam, and Sidney G. Garnish, both of London, England, assignors to GAF Corporation, New York, N.Y.

Filed Aug. 21, 1968, Ser. No. 754,468
Int. Cl. G03c 5/34, 1/58
U.S. Cl. 96—49 12 Claims

Developer compositions and their use in the development of 1- or 2-component diazo-type materials, said compositions containing as a solvent medium, formamide, mono- or dialkyl formamides, 2-pyrrolidone, N-substituted derivatives of 2-pyrrolidone, sulfolane, dimethylsulphoxide, ethylene carbonate, gamma-butyrolactone, and other organic compounds containing the structures

$$>C{=}O,\ >S{=}O \text{ or } >S(=O)_2$$

from 0 to about 95 percent of water, and an alkaline reacting developing agent, with or without an azo coupler.

3,615,486

PHYSICOCHEMICAL RECORDING METHOD

Gerard Albert Delzenne, Wilrijk-Antwerpen, Belgium, assignor to Gevaert-AGFA N.V., Mortsel, Belgium

Continuation of application Ser. No. 553,277, May 27, 1966, now abandoned. This application Nov. 3, 1969, Ser. No. 871,555
Int. Cl. G03c 1/70
U.S. Cl. 96—49 6 Claims

A process is described for recording and reproducing information comprising the steps of imagewise exposing a recording layer comprising a polymeric composition which is photochemically hardenable to actinic light and contacting the exposed layer to a fluid medium containing a solvent and a nonsolvent for the polymeric composition for a period sufficient to mat the unhardened area of the recording layer without removing any substantial part of the polymeric

composition. The resultant recording layer can be used in a manner similar to conventional photoresists, printing plates, and the like.

3,615,487

METHOD FOR THE PRODUCTION OF DIAZO-TYPE INTERMEDIATE ORIGINALS

Roland Moraw, Wiesbaden-Biebrich, and Renate Schulz, Wiesbaden, both of Germany, assignors to Keuffel & Esser Company, Morristown, N.J.

Filed Dec. 8, 1969, Ser. No. 883,337
Claims priority, application Germany, Dec. 10, 1968, P 18 13 713.8
Int. Cl. G03c *5/34, 1/58, 1/54*
U.S. Cl. 96—49 **5 Claims**

Light-sensitive diazo-type material useful in the preparation of intermediate original copies having effective light absorption over a broader wavelength range is prepared by combining P- or o-amino benzene diazonium compounds with azo dye couplers which are enol or phenol compounds having no amino nitrogen on the benzene nucleus, and further including in the light-sensitive composition benzene diazonium compounds having no amino nitrogen on the benzene nucleus or amino phenol azo dye coupler compounds. When diazo-type materials of such composition are exposed and developed in the ordinary manner and are subsequently exposed to strong acids, the resulting images exhibit strong absorption at substantially all of the significant wavelengths of light generated by diazo-type copy device light sources.

3,615,488

PHOTOGRAPHIC PROCESSING COMPOSITION AND PROCESS COMPRISING CYSTEINE AND AN ALDEHYDE BISULFITE

Frank J. Drago, and Clinton Van Grol, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 18, 1970, Ser. No. 20,791
Int. Cl. G03c *5/26, 5/30*
U.S. Cl. 96—50 **26 Claims**

Photographic-processing composition for developing photographic elements in the presence of a developing agent such as hydroquinone, comprising cysteine, an aldehyde bisulfite such as sodium formaldehyde bisulfite and an organic antifoggant. The composition is advantageously employed in a continuous transport processing machine.

3,615,489

STABILIZATION OF PHOTOGRAPHIC PRINTS WITH THIOCYANATE

Henry J. Fassbender, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed June 27, 1968, Ser. No. 740,475
Int. Cl. G03c *5/26*
U.S. Cl. 96—50 **8 Claims**

A process for the stabilization of photographic images includes subjecting a developed silver halide emulsion layer containing the silver images to thiocyanate stabilization and then laminating an organic colloid layer containing a heavy metal salt on a transparent support to the surface of the emulsion layer. Highly stable glossy prints are obtained.

3,615,490

PHOTOGRAPHIC OVERCOAT COMPRISING A BENZOTRIAZOLE TONING AGENT AND A SILVER SALT OF 5-MERCAPTO-1-SUBSTITUTED TETRAZOLE

Charles H. Gaffin, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 23, 1968, Ser. No. 754,960
Int. Cl. G03c *5/26, 7/00, 1/72*
U.S. Cl. 96—50 PL **11 Claims**

A photographic element comprising a support, a photographic silver salt layer and a layer comprising a binder, and the combination of triazole cold toning agent and a silver salt of a mercaptoazole, especially in an overcoat layer of such element, provides improved antiplumming and image tone. A combination of a benzotriazole and a silver salt of a 1-phenyl-5-mercaptotetrazole provides very cold tone images after hot glazing without loss of desired sensitometric properties.

3,615,491

PHOTOGRAPHIC IMAGES

Edith Weyde, Kuerten, Germany, assignor to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 12, 1968, Ser. No. 783,420
Claims priority, application Germany, Dec. 23, 1967, P 15 97 512.9
Int. Cl. G03c *5/26, 5/00*
U.S. Cl. 96—50 **5 Claims**

The production of an improved image by first producing an imagewise metallic silver image in a photosensitive layer and then treating the layer with a substance which decomposes at the metallic silver to result in a superimposed vesicle image. The vesicle image increases the density of the original silver image to provide high sharpness. The process is carried out using a silver salt emulsion in a binding agent to provide the metallic silver upon photographic processing. The binding agent is a suitable resin.

3,615,492

PHOTOGRAPHIC DEVELOPER CONTAINING A PYRIDINE DERIVATIVE

Fritz-Walter Lange, and Jens E. Muller, both of Gauting, Germany, assignors to Hans Schwarzkopf G.m.b.H., Hamburg, Germany

Filed May 24, 1968, Ser. No. 731,730
Claims priority, application Germany, June 1, 1967, P 15 47 660.5
Int. Cl. G03c *7/00, 5/30*
U.S. Cl. 96—52 **3 Claims**

The invention provides a developer solution for simultaneously developing and toning positive photographic prints, the solution containing hydroquinone as the developer and a specified pyridine derivative as toning agent to provide a brown-tinted (e.g. yellowish-brown, olive-brown, reddish-brown, or neutral-brown) print.

3,615,493

METHOD OF PROCESSING COLOR PHOTOGRAPHS BY A SILVER DYE-BLEACHING METHOD

Shigeru Watanabe; Kazunobu Kato, and Nobuo Tsuji, all of Ashigara-Kamigun, Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 24, 1967, Ser. No. 677,726
Claims priority, application Japan, Oct. 25, 1966, 41/70369
Int. Cl. G03c *7/00*
U.S. Cl. 96—53 **3 Claims**

Leucobases of dyes can be used as dyes for photographic light-sensitive color film in a silver dye-bleaching system, without accompanying formation of fog, by processing the film, after dye bleaching, in a cleaning bath containing a water-soluble N-vinylpyrrolidone polymer, a peregal, or a lissolamine.

3,615,494

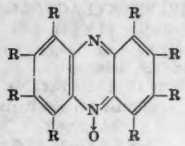
METHOD OF PRODUCING COLOR PHOTOGRAPHIC IMAGES BY THE SILVER DYE BLEACH METHOD

Shigeru Watanabe; Reiichi Ohi; Masatoshi Sugiyama, and Hideo Kondo, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Nakanuma, Minami-Ashigara-Machi, Ashigara-Kamigun Kanagawa, Japan

Filed July 16, 1969, Ser. No. 842,378
Claims priority, application Japan, July 16, 1968, 43/50098
Int. Cl. G03c *7/00*
U.S. Cl. 96—53 **9 Claims**

In a method of preparing a color photographic image by a silver dyestuff bleaching process, the improvement which comprises dyestuff bleaching a color photographic light-

sensitive element in the presence of a phenazine-N-oxide, as a bleaching catalyst, represented by the formula:



wherein R, which may be the same or different groups, represents a member selected from the group consisting of a hydrogen atom, an alkyl group having one to eight carbon atoms, a nitro group, a cyano group, a carboxy group, a sulfogroup, an acylamino group, a sulfonamino group, a halogen atom and a carbocyclic aromatic residue formed by the condensation of two of said R's bonded to adjacent carbon atoms.

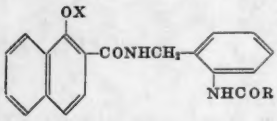
3,615,495

COLOR DEVELOPER COMPOSITION FOR COLOR PHOTOGRAPHY

Shiro Kimura; Atsuaki Arai; Kimio Kishimoto, and Isao Shimamura, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 10, 1968, Ser. No. 696,774
Claims priority, application Japan, Jan. 12, 1967, 42/2354
Int. Cl. G03c *7/00*
U.S. Cl. 96—55 **9 Claims**

A color development composition for color photography containing an aromatic primary amine developing agent and a cyan coupler represented by the following general formula



wherein R represents a member selected from the group consisting of a hydrogen atom, a methyl group and an ethyl group and X represents a member selected from the group consisting of a hydrogen atom and an acyl group.

3,615,496

PHOTOGRAPHIC DEVELOPER COMPOSITIONS

Roy Jones Kanous, Hilton, and Henry Josef Fassbender, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 1, 1968, Ser. No. 702,205
Int. Cl. G03c *7/00*
U.S. Cl. 96—55 **3 Claims**

Aqueous dispersions of benzyl alcohol can be formed with emulsifying agents such as hydroxyethyl cellulose. Such dispersions are highly effective in forming photographic processing solutions.

3,615,497

BENZYL ALCOHOL DISPERSIONS

Henry Josef Fassbender, Rochester, and Roy James Kanous, Hilton, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 702,205, Feb. 1, 1968. This application July 11, 1968, Ser. No. 743,917
Int. Cl. G03c *7/00*
U.S. Cl. 96—55 **4 Claims**

Aqueous dispersions of benzyl alcohol can be formed with emulsifying agents such as hydroxyethyl cellulose. Such dispersions are highly effective in forming photographic processing solutions.

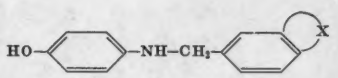
3,615,498

COLOR DEVELOPERS CONTAINING SUBSTITUTED N-BENZYL-*p*-AMINOPHENOL COMPETING DEVELOPING AGENTS

Atsuaki Arai; Mitsugu Tanaka, and Isao Shimamura, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Nakanuma, Minami Ashigara Machi, Ashigara-Kamigun, Kanagawa, Japan

Filed July 29, 1968, Ser. No. 748,205
Claims priority, application Japan, July 29, 1967, 42/48760
Int. Cl. G03c *1/00*
U.S. Cl. 96—55 **11 Claims**

Improved results are obtained upon using a color developing composition which contains an aromatic primary amino developing agent, a color coupler and an alkali if there is incorporated therein a water-soluble compensating developer represented by the general formula



X represents an atomic group necessary to form a heterocyclic ring, and is specifically defined in the specification. Typically, the compensating developer shown is incorporated into a cyan magenta or yellow developing composition.

3,615,499

PHOTOGRAPHIC PROCESSES

Nicholas H. Groet, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 2, 1968, Ser. No. 764,599
Int. Cl. G03c *7/00*
U.S. Cl. 96—55 **12 Claims**

Exposed photographic silver halide emulsions containing development inhibitor releasing coupler are processed in the presence of primary aromatic color developing agent and a competing coupler which produces substantially no permanent dye in the emulsion.

3,615,500

SILVER HALIDE EMULSIONS WHICH CONTAIN COLOR COUPLERS

Harald Huckstadt, Cologne, Stammheim; Erwin Ranz, Leverkusen, and Herbert Grabhofer, Cologne, Flittard, all of Germany, assignors to AGFA-Gavaert Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 21, 1969, Ser. No. 852,073
Claims priority, application Germany, Sept. 6, 1968, P 17 97 263.3
Int. Cl. G03c *7/00, 1/28*
U.S. Cl. 96—55 **10 Claims**

The sensitivity of a light-sensitive photographic material containing in the silver halide emulsion layer a color coupler capable of forming a dye upon reaction with the oxidation product of a color-forming developer is increased by addition of a water-soluble quaternisation product of an α,ω-bis-(thiomorpholinyl)-alkane with a bifunctional polyalkylene oxide.

3,615,501

COLOR PHOTOGRAPHIC DEVELOPING PROCESS

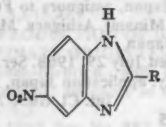
Reiichi Ohi; Isao Shimamura, and Tadao Shishido, all of Kanagawa, Japan, assignors to Fuji Photo Film Co. Ltd., Nakanuma, Minami-Ashigara-Machi, Ashigara-Kamigun, Kanagawa, Japan

Filed Oct. 22, 1969, Ser. No. 868,583
Claims priority, application Japan, Oct. 22, 1968, 43/76923
Int. Cl. G03c *5/30, 7/30*
U.S. Cl. 96—55 **6 Claims**

A process for developing exposed multilayer color photographic silver halide light-sensitive elements which

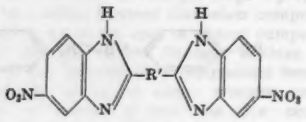
comprises processing said color photographic element in a processing composition containing a compound represented by the general formula:

(I)



wherein R represents an alkyl group having four to 7 carbon atoms or a compound represented by the general formula:

(II)



wherein R' represents an alkylene group having one to eight carbon atoms.

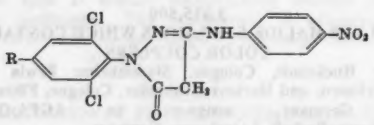
3,615,502

COLOR PHOTOGRAPHIC DEVELOPMENT UTILIZING PYRAZOLONE COUPLERS

Makoto Yoshida, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Nakanuma, Minami Ashigara-Machi, Ashigara-Kanigun, Kanagawa, Japan

Filed Mar. 31, 1970, Ser. No. 24,250
Claims priority, application Japan, Apr. 7, 1969, 44/26266
Int. Cl. G03c *7/00*
U.S. Cl. 96—56.5 **6 Claims**

In a color photographic developing process, the use of a coupler of the formula



wherein R is methyl or methoxy.

3,615,503

COLOR-DEVELOPING COMPOSITION CONTAINING AN ANTIOXIDANT

Charles O. Edens, and Rowland G. Mowrey, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 27, 1969, Ser. No. 803,097
Int. Cl. G03c *7/00, 5/30*
U.S. Cl. 96—56 **19 Claims**

Color-developing compositions comprising a primary aromatic amine color-developing agent and as an antioxidizing agent certain linear compounds that are capable of existing in equilibrium with an enol form of said compound and that are not capable of intramolecular cyclization are advantageously used for color development because substantially less color-developing agent is lost from aerial oxidation than is lost from color developer compositions containing prior art antioxidants without the undesirable reduction in pH produced in prior art developer compositions by prolonged exposure to air.

3,615,504

SILVER HALIDE COLOR PHOTOGRAPHY UTILIZING 2-PYRAZOLIN-5-ONE COLOR COUPLERS CONTAINING IN THE 3-POSITION A 2,4,6-TRIMETHYLPHENYLACYLAMINO GROUP

Marcel Jacob Monbaliu, Mortsel, and Raphael Karel Van Poucke, Berchem, both of Belgium, assignors to Gevaert-AGFA N. V., Mortsel, Belgium

Filed June 19, 1969, Ser. No. 834,873
Claims priority, application Great Britain, July 18, 1968, 34339/68
Int. Cl. G03c *7/00*
U.S. Cl. 96—56.5 **9 Claims**

Silver halide photographic materials and processes utilizing 2-pyrazolin-5-one color couplers carrying in the 3-position a 2, 4, 6-trimethylphenylacylamino group.

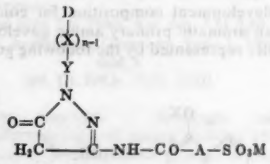
3,615,505

SILVER HALIDE EMULSION CONTAINING 2-PYRAZOLIN-5-ONE COLOR COUPLER

Raphael Karel Van Poucke, Berchem; Marcel Jacob Monbaliu, Mortsel, and Gaston Jacob Benoy, Edegem, all of Belgium, assignors to Gevaert-AGFA N.V., Mortsel, Belgium

Filed Mar. 12, 1969, Ser. No. 806,715
Claims priority, application Great Britain, Apr. 10, 1968, 17222/68
Int. Cl. G03c *7/00*
U.S. Cl. 96—56.5 **10 Claims**

Photographic materials comprising novel magenta forming 2-pyrazolin-5-one color couplers corresponding to the formula:



wherein:

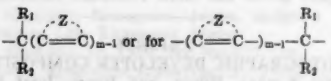
Y stands for a bivalent aromatic group,

X stands for oxygen, sulfur sulphonyl,–$SO_2N(R)$–R being hydrogen or lower alkyl,–CONH–or–N(alkyl)–,

D represents a residue rendering the molecule fast to diffusion and comprising from five to 20 carbon atoms,

n stands for 1 or 2,

A stands for



wherein m=1 or 2 and each of R_1 and R_2 stands for hydrogen, alkyl or aryl, R_1 and R_2 both being hydrogen when m=2, and Z represent the atoms necessary to complete an aromatic nucleus, and

M stands for hydrogen, an alkali metal atom or an ammonium group, are described. The materials have good stability to light, heat, and humidity and have good spectral characteristics,

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3,615,506

SILVER HALIDE EMULSIONS CONTAINING 3-CYCLICAMINO-5-PYRAZOLONE COLOR COUPLERS

John R. Abbott, and William F. Coffey, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 812,853, Apr. 2, 1969, now abandoned. This application Feb. 9, 1970, Ser. No. 9,665
Int. Cl. G03c *7/00, 1/40*
U.S. Cl. 96—56.5 **7 Claims**

Novel 3-(cyclicamino)-5-pyrazolones and other 3-(substituted amino)-5-pyrazolone couplers valuable for use

in color photography are advantageously prepared in good yields from the corresponding 3-alkoxy-5-pyrazolones by a novel single step synthesis in which a mixture of (1) the appropriate 3-alkoxy-5-pyrazolone, or a primary amine and (3) an acid catalyst having a pKa smaller than about 10.2 is heated.

3,615,507

PHOTOGRAPHIC BLEACH-FIX SOLUTIONS

Charleton C. Bard, and Julius C. Battaglini, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 13, 1968, Ser. No. 783,750
Int. Cl. G03c *5/38*
U.S. Cl. 96—60 **6 Claims**

Compositions which are effective as photographic bleach-fixes can be prepared from solutions containing substantial amounts of reduced oxidant, e.g., ferrocyanide, and dissolved silver by reaction with iodine which oxidizes the reduced oxidant and precipitates silver as silver iodide. This can be used for effective regeneration of photographic bleach-fix compositions.

3,615,508

PHOTOGRAPHIC BLIXES AND BLIXING

Keith H. Stephen, and John J. Surash, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 3, 1969, Ser. No. 873,497
Int. Cl. G03c *5/32*
U.S. Cl. 96—60 BF **22 Claims**

Photographic blix compositions containing (a) an ammonium or amine salt of the Fe^{+++}, Co^{+++}, or Cu^{+++} complex with a polyfunctional ligand as the silver bleaching agent, (b) an amine or an ammonium thiosulfate and (c) a salt having as a cation an ammonium ion or a water-soluble amine with an ionizable proton attached to a nitrogen atom in the amine and as an anion a sulfite ion, bisulfite ion or a metabisulfite ion either with or without (d) an amine or ammonium salt of unchelated polyfunctional ligand are advantageously prepared in concentrated stock solutions or as dry mixtures to make working blix solutions that clear silver even in high concentrations along with residual silver halides from developed silver halide emulsion layers with substantially shorter clearing times than blixes outside the invention.

3,615,509

PHOTOGRAPHIC FIXER-DEVELOPER CONTAINING COMPOUNDS WITH *p*-AMINOPHENOL AND DYE-FORMING NUCLEI

Dieter Klein, Gotzenhain; Gerhard Heimann, Neu-Isenburg; Abele Werner, Neu-Isenburg, and Gerd. Joh. Oosterloo, Neu-Isenburg, all of Germany, assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 11, 1970, Ser. No. 10,616
Int. Cl. G03c *5/38, 5/30, 7/00*
U.S. Cl. 96—61 M **6 Claims**

Photographic fixer-developer for silver halide layers, characterized in that it contains an alkaline compound, a fixing agent, e.g., sodium, potassium or ammonium thiosulfate, and at least one developer-coupler compound having within the same molecule a p-aminophenol nucleus capable of developing a silver halide image and a separate dye-forming nucleus capable of forming a quinoneimine or azomethine dye. The p-aminophenol nucleus is linked to the dye nucleus through a

group, free bonds attached to C and to N are attached to cyclic carbons. The fixer-developers are superior to prior developers with regard to contrast and maximum image density.

3,615,510

SILVER HALIDE COMPLEXING AGENTS

Joseph S. Yudelson, and Randall E. Mack, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 29, 1966, Ser. No. 575,548
Int. Cl. G03c *5/38, 1/34*
U.S. Cl. 96—61 **16 Claims**

Photographic silver halide can be stabilized with certain organic sulfonium, organic sulfoxonium, organic ammonium, organic phosphonium, organic boronium, and/or organic siliconium halides of mixtures of these. These can be employed in a photographic element, processing solution or processing web. They are useful in combination with a nonaqueous, low-melting solvent, e.g. succinimide, sulfamide, urea, or acetamide.

3,615,511

SURFACE DEVELOPER WITH HETEROCYCLIC MERCAPTAN FOR USE ON INTERNAL IMAGE EMULSION

Roger M. Cole, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 22, 1968, Ser. No. 731,275
Int. Cl. G03c *5/38*
U.S. Cl. 96—61 **13 Claims**

Processes and compositions for developing or stabilizing image records in photographic, internal image, silver halide compositions. In one aspect, the developing or stabilizing compositions of this invention contain low concentrations of a silver complexing agent. In another aspect, photographic compositions are stabilized or developed with a process comprising a bleach bath followed by a surface type developer. In a preferred embodiment direct-print materials containing either photodeveloped images or nonphotodeveloped latent images can be processed to provide permanent image records.

3,615,512

PHOTOGRAPHIC COMPOSITIONS AND PROCESS FOR STABILIZING IMAGE RECORDS WITH SAID COMPOSITIONS

Jacques Ducrocq, and Daniel Gallois, both of Vincennes, France, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 16, 1968, Ser. No. 768,155
Int. Cl. G03c *5/38, 5/30*
U.S. Cl. 96—61 **16 Claims**

Photographic compositions comprising (1) a silver halide developing agent, (2) a water-soluble silver halide solvent and (3) a weak silver halide complexing agent. In one embodiment the above composition can be used to rapidly develop or stabilize image records in silver halide emulsions which contain addenda which lower the rate of dissolution of silver halide in a potassium thiocyanate solution.

3,615,513

INHIBITION OF SILVERING IN PHOTOGRAPHIC PROCESSING SOLUTIONS

Grant Milford Haist, and David Alan Pupo, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 505,967, Nov. 1, 1965, now abandoned. This application Dec. 29, 1969, Ser. No. 888,809
Int. Cl. G03c *5/38*
U.S. Cl. 96—61 M **11 Claims**

Orthomercaptobenzoic acid provides good antisludgant action in photographic processing solutions. It is effective in

inhibiting silvering or sludging in monobaths, especially in monobaths having high silver halide solvent activity. These include so-called thiosulfate monobaths.

3,615,514

A THIOCYANATE STABILIZING BATH CONTAINING CYCLOHEXANONE BISULFITE

Werner Berthold, Kiel; Karl Frank, Leverkusen, and Anita Von Konig, Leverkusen, all of Germany, assignors to AFGA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 12, 1968, Ser. No. 712,358
Claims priority, application Germany, Mar. 25, 1967, A 55 261
Int. Cl. G03c 5/38
U.S. Cl. 96—61 1 Claim

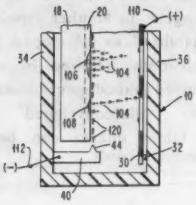
Complexing bath for stabilizing silver image in silver halide emulsion which is not adequately fixed, is improved by addition of cyclic ketone bisulfite.

3,615,515

PHOTOGRAPHIC PROCESSING METHOD UTILIZING ELECTROPHORESIS AND ELECTROLYSIS OF THE DEVELOPER

Daniel J. Lasky, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed July 12, 1968, Ser. No. 744,405
Int. Cl. G03c 5/24
U.S. Cl. 96—63 8 Claims



A method of developing photographic emulsion layers whereby fresh developer is supplied during development to different sized image areas in proportion to their size. Conventional development releases negatively charged waste particles that congregate adjacent the image areas. A positively charged electrode in the developer tank attracts the particles, permitting fresh developer to reach the image areas to continue development. Optionally, a negatively charged electrode electrolyzes the developer, releasing hydrogen bubbles which scrub the face of the developing layer; dislodging the waste particles.

3,615,516

DEVELOPMENT TECHNIQUE FOR SILVER HALIDE DIRECT POSITIVE WITH N-VINYL-2-PYRROLIDONE POLYMER

Joseph Louis De Munck, Kalmthout, and Raymond Leopold Florens, Edegem, both of Belgium, assignors to Gevaert-AGFA N.V., Mortsel, Belgium

Filed Sept. 18, 1967, Ser. No. 668,685
Claims priority, application England, Sept. 19, 1966, 41,638/66
Int. Cl. G03c 5/24
U.S. Cl. 96—64 15 Claims

A light-sensitive photographic material comprising a direct positive silver halide emulsion of the Herschel type containing an N-vinyl-2-pyrrolidone polymer and the development of this emulsion is described. These emulsions yield a marked increase in gradation.

3,615,517

DIRECT-POSITIVE SILVER HALIDE EMULSION CONTAINING HALOGEN CONDUCTOR AND ELECTRON ACCEPTOR DEVELOPED WITH POLYHYDROXY BENZENE

Kirby M. Milton, Fishers, N.Y., and Bernard D. Illingsworth, deceased, late of Rochester, N.Y. (by Mary D. Illingsworth, executrix), assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 9, 1968, Ser. No. 759,819
Int. Cl. G03c 5/24
U.S. Cl. 96—64 23 Claims

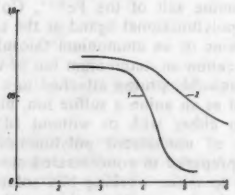
Process for developing blue-sensitve-direct-positive silver halide photographic elements with a polyhydroxybenzene developing agent wherein the silver halide emulsion of the element comprises fogged silver halide grains and an organic compound which accepts electrons, wherein said halide is at least 50 mole percent chloride and novel blue-sensitive-direct-positive emulsions which can be used in this process.

3,615,518

CORED DIRECT POSITIVE EMULSION FOR PHOTOSOLUBILIZATION PROCESS

Erik Moisar, Cologne-Flittard, Germany, assignor to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 17, 1968, Ser. No. 760,216
Claims priority, application Germany, Oct. 4, 1967, P 15 97 484.2
Int. Cl. G03c 5/24
U.S. Cl. 96—64 4 Claims



This invention relates to a photosolubilization process for the production of images by means of exposing emulsions having a lowered rate of solution because of a silver salt which is less soluble than silver chloride, after which exposed elements are removed with a silver halide solvent to produce an image. The sensitivity of this emulsion is increased by internal sensitivity specks in the composite grain structure of the silver halide which specks are the core of the grains chemically ripened as by gold and sulfur sensitization. The processing of the exposed photographic material being carried out under otherwise usual conditions.

3,615,519

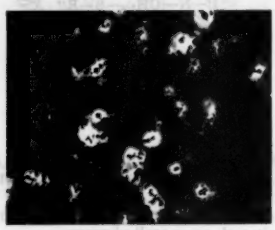
DIRECT-POSITIVE LITHOGRAPHIC ELEMENTS AND PROCESSES FOR DEVELOPING SAME

Kirby M. Milton, Fishers, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 9, 1968, Ser. No. 758,582
Int. Cl. G03c 5/24
U.S. Cl. 96—64 34 Claims

Direct-positive-blue-sensitive, chemically fogged, silver halide photographic elements containing an alkylene oxide polymer and a process for developing direct-positive-blue-sensitive, silver halide photographic elements in the presence of a polyhydroxybenzene developer and an alkylene oxide polymer.

3,615,520
NOVEL PHOTOGRAPHIC PRODUCTS AND PROCESSES
Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.
Filed June 13, 1968, Ser. No. 736,810
Int. Cl. G03c 5/24, 1/06
U.S. Cl. 96—64 15 Claims



The present invention relates to a photographic film unit which comprises a support carrying on one surface a photosensitive silver halide emulsion comprising silver halide crystals which contain at least two halides selected from the group consisting of iodide, bromide and chloride, such as, for example, silver iodobromide, silver chloroiodobromide, and silver precipitating nuclei; and to specified photographic processes employing such film units.

3,615,521
PHOTOGRAPHIC COMPOSITIONS AND PROCESSES-A
Edwin N. Oftedahl, Jr., Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Oct. 1, 1968, Ser. No. 764,358
Int. Cl. G03c 5/30
U.S. Cl. 96—66 16 Claims

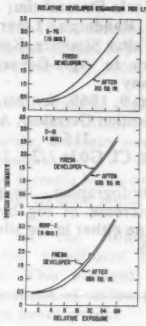
Photographic developing agents, which are lactone derivatives, such as coumarin derivatives and especially 6-hydroxy coumarin and 6-amino coumarin derivatives, and which have the property of forming a lactone developing agent precursor under neutral, slightly alkaline and acid conditions provide less stain without loss of desired sensitometric properties in photographic developer compositions, elements and processes. They are suitable in combination with other photographic developing agents. Corresponding lactone developing agent precursors are also especially useful.

3,615,522
PROCESS FOR DEVELOPMENT OF MULTILAYER COLOR PHOTOGRAPHIC MATERIALS
Reiichi Ohi; Haruhiko Iwano; Tadao Shishido, and Isao Shimamura, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed July 15, 1969, Ser. No. 842,011
Claims priority, application Japan, July 15, 1968, 43/49818
Int. Cl. G03c 5/50, 5/52, 5/30
U.S. Cl. 96—66 R 17 Claims

Method of processing a silver halide multilayer color photographic material which comprises the incorporation of a mercaptotriazole compound into one of the processing solutions. Such incorporation causes selective inhibition of the development of the uppermost emulsion layer, resulting in a developed material possessing improved, balanced contrast.

3,615,523
PHOTOGRAPHIC DEVELOPER
John A. Difley, Monrovia, and William C. Miller, Pasadena, both of Calif., assignors to Carnegie Institution of Washington, Washington, D.C.
Filed Aug. 12, 1969, Ser. No. 849,315
Int. Cl. G03c 5/30
U.S. Cl. 96—66 2 Claims

A photographic developer containing sodium or potassium sulfite, carbonate and bromide, hydroquinone, 1-phenyl-3-pyrazolidone, and benzotriazole in aqueous solution yields



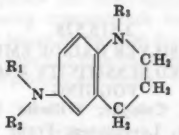
heretofore unattained photographic efficiency when applied to plates and films in general use for scientific photography.

3,615,524
METHOD FOR PROCESSING HIGH-CONTRAST PHOTOGRAPHIC ELEMENTS
Kirby M. Milton, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Aug. 18, 1967, Ser. No. 661,533
Int. Cl. G03c 5/30, 5/26
U.S. Cl. 96—66.3 14 Claims

Processing high-contrast photographic elements, said elements comprising a silver halide emulsion layer in which the halide comprises at least about 50 mole percent chloride, in a continuous transport processing machine wherein the developer solution contains a carbonyl bisulfite-amine condensation product and said element contains a cadmium salt such as cadmium chloride.

3,615,525
DERIVATIVE OF 6-AMINO-1,2,3,4-TETRAHYDROQUINOLINE AS SUPERADDITIVE IN DEVELOPING COMPOSITION
Jozef Frans Willems, Wilrijk, and George Frans Van Veelen, Mortsel, both of Belgium, assignors to Gevaert-AGFANV, Mortsel, Belgium
Filed May 7, 1968, Ser. No. 727,358
Claims priority, application Great Britain, May 24, 1967, 24,191/67
Int. Cl. G03c 5/30
U.S. Cl. 96—66.3 6 Claims

Photographic developing compositions comprising hydroquinone and a quinoline derivative having the formula



wherein R_1 is an alkyl group comprising from one to five carbons atoms, R_2 is an alkyl group comprising from one to five carbon atoms, and R_3 is hydrogen, or an alkyl group comprising from one to five carbon atoms, at most one of R_1, R_2 and R_3 being substituted alkyl are described. These compositions provide super-additive development in photographic processes.

3,615,526

TETRAALKYL-BIS-AMINOMETHYL DISILOXANE AS A SENSITIZER FOR SILVER HALIDE IN THE EMULSION OR DEVELOPER BATH

Harald Huckstadt, Koeln-Stammheim; Wolfgang Himmelmann, Koeln-Stammheim; Wilhelm Saleck, Schildgen; August Randolph, Leverkusen; Erwin Ranz, Leverkusen, and Walter Simmler, Koeln-Stammheim, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 9, 1969, Ser. No. 815,280
Claims priority, application Germany, Apr. 27, 1968, P 17 72 315.8
Int. Cl. G03c 1/28, 5/30
U.S. Cl. 96—66.3 13 Claims

In producing photographic images, increasing the sensitivity without increase of fog by using tetraalkyl-bis-aminomethyl disiloxane either in the silver halide emulsion or in the developing bath.

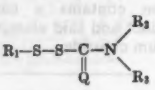
3,615,527

PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL AND DEVELOPMENT PROCESS COMPRISING A DEVELOPMENT ACCELERATOR

Fumihiko Nishio, Kanagawa; Hideo Kawano, Kanagawa; Mitsunori Sugiyama, Kanagawa; Takeo Sakai, Kanagawa, and Osami Aki, Kawanishi-shi, Hyogo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed June 30, 1969, Ser. No. 837,869
Claims priority, application Japan, June 29, 1968, 43/45390
Int. Cl. G03c 5/26, 1/06
U.S. Cl. 96—66.3 17 Claims

A photographic light-sensitive material wherein at least one silver halide emulsion layer and/or photographic layer adjacent thereto contains a compound represented by the formula:



R_1 can be a one–five carbon atom alkyl group, a one–five carbon atom hydroxyalkyl group, a tetrafurfuryl group or a seven–12 carbon atom aralkyl group. R_2 and R_3 can be a hydrogen atom, a one–five carbon atom alkyl group or an atomic group capable of forming a ring via linkage with R_2 and R_3. Q can be a sulfur atom or an imino group.

Further described is a method of photographic reproduction which comprises exposing a photographic light-sensitive material as described above and developing said exposed material with an infectious developer containing hydroquinone.

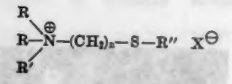
3,615,528

PHOTOGRAPHIC SILVER HALIDE EMULSION HAVING AN INCREASED SENSITIVITY AND REDUCED FOGGING

Harald Huckstadt, Cologne; Wilhelm Saleck, Schildgen; August Randolph, Leverkusen; Franz Moll, Leverkusen, and Anita Von Koenig, Leverkusen, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 9, 1969, Ser. No. 883,606
Claims priority, application Germany, Dec. 23, 1968, P 18 16 570.3
Int. Cl. G03c 5/24, 1/28, 1/34
U.S. Cl. 96—66.3 11 Claims

The sensitivity of light-sensitive photographic silver halide emulsions can be increased and the fogging can be decreased if the chemical ripening of that emulsions is performed in the presence of mercapto alkyl quaternary salts or acetothioalkyl quaternary salts of the following formula



wherein:

R represents alkyl with up to 6 carbon atoms; two R radicals of the same nitrogen can be combined to form a heterocyclic ring;

R′ represents alkyl with up to 6 carbon atoms, which can be substituted, or an aralkyl group;

R″ represent H or $-CO-CH_3$;

n is 1 to 6; and

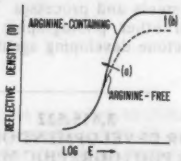
$X^{\ominus}$ is any anion.

3,615,529

RAPID DEVELOPING PHOTOGRAPHIC MATERIALS CONTAINING ARGININE

Tatsuya Tajima, and Katsumi Hayaski, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of application Ser. No. 536,979, Mar. 24, 1966, now abandoned. This application Dec. 12, 1969, Ser. No. 884,436
Int. Cl. E03c 5/30, 1/06, 1/48
U.S. Cl. 96—66.3 10 Claims



Improved process for rapid development of photographic material, particularly a process for developing a latent image formed upon a photographic silver halide emulsion layer by treating the element with an alkaline activator solution in the presence of arginine.

3,615,530

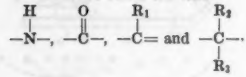
PHOTOGRAPHIC PROCESS FOR PHOTOGRAPHIC SILVER HALIDE LIGHT-SENSITIVE ELEMENTS

Haruhiko Iwano, and Isao Shimamura, both of Ashigarakamigun, Kanagawa, Japan, assignors to Fuji Shashin Film Kabushiki Kaisha

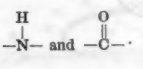
Filed Oct. 2, 1968, Ser. No. 764,591
Claims priority, application Japan, Oct. 2, 1967, 42/63359
Int. Cl. G03c 5/30, 5/38
U.S. Cl. 96—66.5 2 Claims

An improved developing process for photographic silver halide elements wherein the element is subjected to processing between a prehardening step and a development

step with an aqueous solution containing a heterocyclic compound having structural units which comprise at least two members which are from the group consisting of



at least one structural unit must be from the group consisting of



R_1, R_2 and R_3 may each be a hydrogen atom, a methyl group or an ethyl group.

3,615,531

ANTISTATIC LAYERS CONTAINING POLYMERS OF SULFO-SUBSTITUTED N-PHENYL MALEIC IMIDES

Karl-Otto Meyer, Leverkusen; Wulf Von Bonin, Leverkusen; Wolfgang Himmelmann, Cologne-Stammheim; Julius Geiger, Leverkusen, and Werner Wagenknecht, Cologne-Suelz, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 2, 1969, Ser. No. 881,599

Claims priority, application Germany, Dec. 20, 1968, P 18 15 944.9

Int. Cl. G03c *1/78*

U.S. Cl. 96—67 **4 Claims**

A photographic material with improved antistatic properties. The material contains an outermost antistatic layer of a polymer containing N-phenyl maleic imides units.

3,615,532

PRINTING PLATE COMPOSITIONS

Julius L. Silver, Somerset, Franklin Township, N.J., assignor to Union Carbide Corporation

Continuation-in-part of application Ser. No. 109,015, May 10, 1961, now abandoned, Continuation-in-part of application Ser. No. 109,254, May 11, 1961, now abandoned. This application Dec. 9, 1963, Ser. No. 329,247

Int. Cl. G03f *7/02, 7/08;* **G03c** *1/52*

U.S. Cl. 96—67 **17 Claims**

A printing plate composition comprising (1) the association product of a normally solid water-soluble ethylene oxide polymer and a heat-fusible phenolic resin, (2) a nonoxidizing acidic compound, and (3) a photosensitizing agent.

3,615,533

HEAT AND LIGHT SENSITIVE LAYERS CONTAINING HYDRAZONES

Frederick J. Rauner, and Paul B. Gilman, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 11, 1968, Ser. No. 711,868

Int. Cl. G03c *1/76*

U.S. Cl. 96—67 **24 Claims**

Certain ketone and aldehyde organic hydrazones exhibit utility in radiation-sensitive layers and elements as a spectral sensitizer for silver halide and as a selective reducing agent in photographic, thermographic and photothermographic layers.

3,615,534

PHOTOGRAPHIC SILVER HALIDE LIGHT-SENSITIVE ELEMENTS USEFUL IN PREVENTING YELLOW FOG

Tatsuya Tajima, and Kunioki Ohmura, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sept. 23, 1968, Ser. No. 761,858

Claims priority, application Japan, Sept. 22, 1967, 42/60921

Int. Cl. G03c *1/76, 3/00, 1/34*

U.S. Cl. 96—67 **4 Claims**

A photographic silver halide light-sensitive element comprising a support having thereon at least one layer containing a silver halide, wherein one colloid containing layer of said element contains:

a. a compound of the formula MIO_3 or MIO_4, wherein M is a hydrogen atom, an alkaline metal atom or ammonium group, and

b. at least one of the following: unsubstituted benzenesulfinic acid, substituted benzenesulfinic acid and salts thereof. This element exhibits a marked reduction in the amount of yellow fog which is formed after storage and/or development.

3,615,535

PHOTOGRAPHIC ELEMENT, PRODUCT, COMPOSITION AND PROCESS

James G. Smith, and Dorothy J. Beavers, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 18, 1970, Ser. No. 20,790

Int. Cl. G03c *1/48*

U.S. Cl. 96—76 **18 Claims**

In a photographic diffusion transfer system a hydroquinone silver halide developing agent, containing a methyl, ethyl or alkoxy group in the 5 position and a carboxyalkyl group containing 4 to 9 carbon atoms in the 2 position of the hydroquinone nucleus, provides reduced stain as well as improved maximum density, desired black tone, without loss of other desired sensitometric properties. Such developing agents, e.g. 6(2,5-dihydroxytolyl) hexanoic acid, are especially useful in a black and white silver salt diffusion transfer process. They can be incorporated in a photographic element and can be employed in combination with other silver halide developing agents.

3,615,536

PHOTOGRAPHIC ELEMENT AND PROCESS HAVING A LIGHT-SENSITIVE METAL COMPLEX

Carl J. Williams, Jr., Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 2, 1968, Ser. No. 694,828

Int. Cl. G03c *1/76*

U.S. Cl. 96—73 **16 Claims**

Light-sensitive photographic elements incorporating an azo dye and, as a physical development nuclei precursor, a light-sensitive component which is either a photoactivated metal oxide in combination with a water soluble silver salt or a heavy metal complex coated at a metal coverage of from about 0.5 mg/ft.^{2} to about 10 mg./ft.^{2} can be processed by dye bleach means to yield positive dye images. Preferred heavy metal complexes are silver-spectral sensitizing dye complexes. Processing comprehends forming an exposed imagewise metallic image by physical development including diffusion transfer means and then conventional dye bleaching to produce the final positive dye image.

3,615,537

HEAT-DEVELOPABLE DIAZOTYPE MATERIAL

Leonardus Jacobus Antonius Giesen, and Hubertus Wilhelmus Henricus Maria Roncken, both of Venlo, Netherlands, assignors to Van Der Grinten N.V., Venlo, Netherlands

Filed Nov. 24, 1967, Ser. No. 685,287

Claims priority, application Netherlands, Dec. 2, 1966, 66.17031

Int. Cl. G03c *1/58*

U.S. Cl. 96—75 **11 Claims**

Diazo-type material readily developable by heat, having good keeping quality, and producible economically by

aqueous coating techniques, comprises a light-sensitive layer containing, with a diazo compound, an acid-reacting stabilizer and a water-soluble hydrophilic organic binder, a substantially water insoluble acylacetamide as azo-coupling component and a substantially water insoluble developing agent, each dispersed as particles of .01–10 microns average size, the developing agent when heated above 100° C. creating a medium wherein coupling occurs, the acylacetamide melting above 50° C. and having solubility of less than 1×10^{13} mol/liter in water at 20° C. The acylacetamide is yellow-coupling. Its use with a blue-coupling compound provides material that develops a black image, as by the use of dispersed particles of a N,N′-bis(acylacet)-alkyl-enediamine with 2,3-dihydroxynaphthalene-6-sulfonic acid or a salt thereof.

3,615,538

PHOTOSENSITIVE PRINTING PLATES

John E. Peters, and Donald B. Johnson, both of Racine, Wis., assignors to Printing Developments, Inc., New York, N.Y.

Filed Aug. 2, 1968, Ser. No. 749,582
Int. Cl. G03c *1/68, 1/52, 1/94*
U.S. Cl. 96—75 **11 Claims**

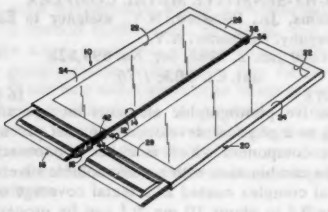
Photosensitive printing plates wherein the photosensitive resist coating is adhered to the metallic base layer by means of a silane compound to improve the physical properties of the photosensitive resist coating so it will withstand mechanical action during hand development and further wherein the photosensitive resist coating also contains a dye or a pigment to increase contrast after development, to improve reproduction characteristics and to increase mechanical resistance.

3,615,539

SELF-DEVELOPING PHOTOGRAPHIC FILM UNIT AND PROCESS HAVING SECURED FACE-TO-FACE SURFACE

Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 10, 1967, Ser. No. 622,287
Int. Cl. G03c *1/48*
U.S. Cl. 96—76 **4 Claims**



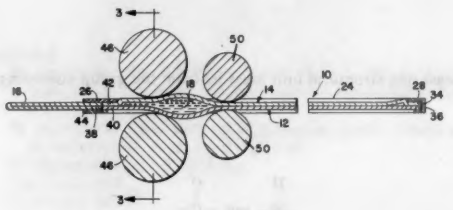
A photographic film unit comprising all of the materials, including a liquid processing agent, required to produce a photographic print and a method of rapidly spreading a viscous liquid processing agent in a continuous uniform layer between a pair of superposed sheets without entraining air in the liquid. A film unit is disclosed comprising a photosensitive sheet and a transparent sheet secured in face-to-face relation at the edges of the sheets and a collapsible container of a viscous processing liquid secured at one edge of the sheets so as to discharge its fluid contents between the sheets when compressive pressure is applied to the container. A method is disclosed in which the sheets are held in face-to-face contact to exclude air from between the sheets during spreading of the processing liquid therebetween facilitate spreading and to preclude entrainment of air in the liquid.

3,615,540

PHOTOGRAPHIC FILM ASSEMBLAGE AND METHOD FOR RELEASE OF GAS IN DIFFUSION TRANSFER SYSTEM

Edwin H. Land, Cambridge, and Albert J. Bachelder, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 31, 1967, Ser. No. 627,538
Int. Cl. G03c *1/48*
U.S. Cl. 96—76 **3 Claims**



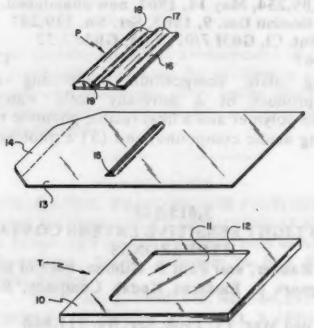
A photographic film unit comprising all of the materials required to produce a photographic print including a pair of sheets secured at their margins in face-to-face relation and a liquid processing agent; and a method of rapidly spreading a viscous liquid processing agent in a continuous uniform layer between the superposed sheets. A film unit is disclosed comprising a photosensitive sheet and a second sheet secured in face-to-face relation at the edges of the sheets by essentially fluidtight binding means adopted to release gas from between the sheets during spreading of the liquid carried in a collapsible container secured at one edge of the sheets so as to discharge its contents between the sheets when compressive pressure is applied to the container. A method is disclosed in which gas is discharged from between the sheets during spreading of the processing liquid therebetween and liquid is prevented from escaping by way of the means for releasing the gas.

3,615,541

SLIDE TRANSPARENCY UNIT FOR IN CAMERA PROCESSING

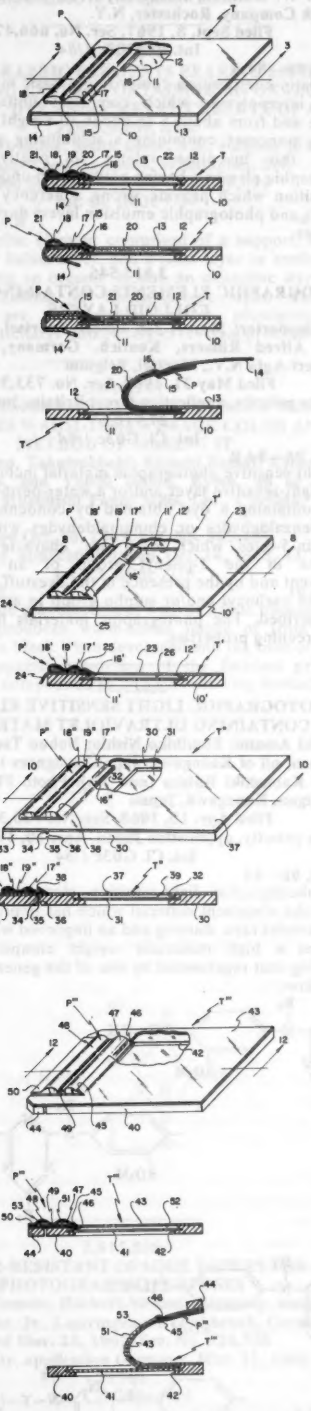
Nerwin Hubert, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 16, 1967, Ser. No. 675,608
Int. Cl. G03c *1/48, 3/00*
U.S. Cl. 96—76 C **16 Claims**



A slide transparency unit is provided with a pair of rupturable pods attached to a rectangular mount having a

central opening, across which a photosensitive transparency extends. The first pod is adapted to be ruptured so that a developing agent contained therein is injected into a space between the transparency and a strippable sheet so that development of the transparency image can take place. After a suitable development period, the second pod is ruptured and the developing agent therein also is injected into the space between the transparency and the strippable sheet and spread across the transparency so that the image is fixed on the transparency. Finally, the strippable sheet, the pods, and any unabsorbed developing agents are stripped from the unit so that the unit is ready for viewing.



3,615,542

LIGHT-SENSITIVE SILVER HALIDE COLOR-PHOTOGRAPHIC MATERIAL

Masanobu Oguchi; Akira Horikoshi, and Kensaku Tanimura, all of Tokyo, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Feb. 29, 1968, Ser. No. 709,174
Claims priority, application Japan, Mar. 3, 1967, 42/13,111
Int. Cl. G03c *1/42*
U.S. Cl. 96—77 **5 Claims**

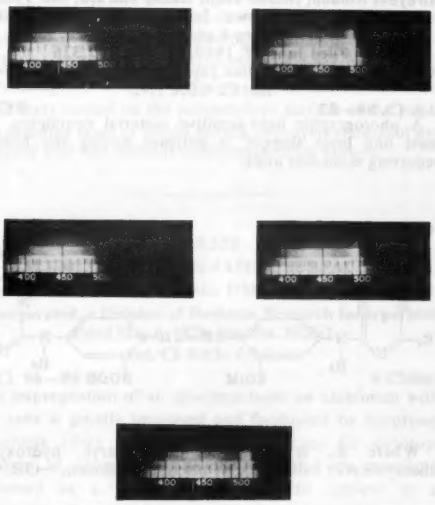
Light-sensitive silver halide color-photographic material comprises a support and, coated thereon, a light-sensitive silver halide emulsion layer containing a color former, and a complex formed from (a) an alkali-soluble phenolic compound having a hydroxyl group on its benzene nucleus and capable of reducing silver halide and (b) a water-soluble polymeric vinyl compound capable of forming a complex with said phenolic compound, said complex being included in said emulsion and/or in a layer contiguous therewith.

3,615,543

MULTICOLOR PHOTOGRAPHIC ELEMENT COMPRISING AN OXACYANINE SENSITIZING DYE

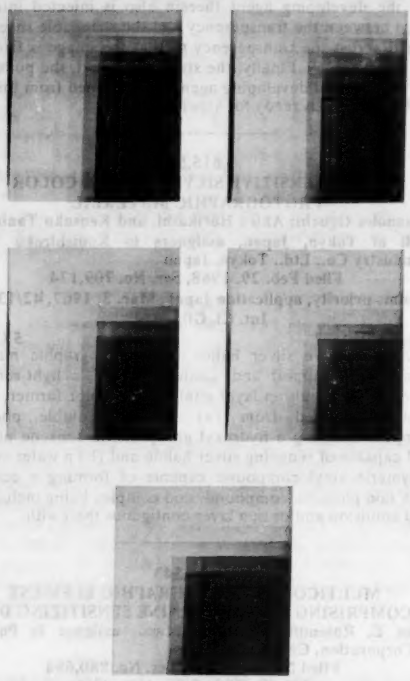
Alan E. Rosenoff, Waltham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 28, 1969, Ser. No. 880,684
Int. Cl. G03c *7/00, 1/40, 1/16*
U.S. Cl. 96—77 **9 Claims**



Photosensitivity of a blue-sensitive emulsion in a multicolor diffusion transfer photographic system may be

increased by sensitizing that emulsion with a member of a



class of oxacyanine dyes.

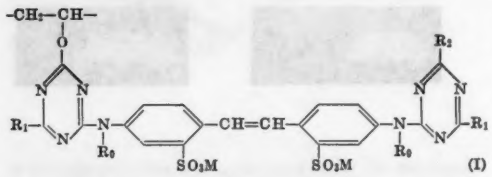
3,615,544

PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A POLYMERIC BRIGHTENING AGENT

Hiroyuki Amano; Nobuo Tsuji; Kazuo Shirasu, and Yoshinori Tutiya, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Ashigara-Kamigun, Kanagawa, Japan

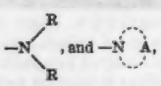
Filed June 27, 1969, Ser. No. 837,326
Claims priority, application Japan, June 27, 1968, 43/44719
Int. Cl. G03c *1/92*
U.S. Cl. 96—82 9 Claims

A photographic light-sensitive material containing, in at least one layer thereof, a polymer having the following recurring monomer units:



(I)

Where R_0 is hydrogen, alkyl, aryl, hydroxyalkyl, alkoxyalkyl or sulfoalkyl, R_1 and R_2 are halogen, —OR, —SR,



M is alkali metal or ammonium, R and R′ are hydrogen, alkyl, hydroxyalkyl, sulfoalkyl, carboxyalkyl, aralkyl or cycloalkyl, and A is $-(CH_2)_4-$, $-(CH_2)_5-$, $-(CH_2)_2-O-(CH_2)_2-$ or $-(CH_2)_2-S-(CH_2)_2-$ R_1 and R_2, and R and R′ may be the same or different.

3,615,545

NOVEL MORDANT COMPOSITIONS AND PHOTOGRAPHIC ELEMENTS CONTAINING SAME

Norman W. Kalenda, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 8, 1967, Ser. No. 666,473
Int. Cl. G03c *1/84*
U.S. Cl. 96—84 A 4 Claims

A gelatin composition comprising a basic mordant and an acrylic interpolymer which comprises units of an alkyl acrylate and from about 5 to about 30 weight percent of an ethenic monomer containing a solubilizing group. In one aspect, this invention relates to relatively insoluble photographic elements having antihalation undercoats of said composition which provide strong adherency between film supports and photographic emulsion layers during developing processes.

3,615,546

PHOTOGRAPHIC ELEMENTS CONTAINING COLORED COLLOID LAYERS

Henri Depoorter; Marcel Jan Libeer, Mortsel, Belgium, and Guy Alfred Rillaers, Kontich, Germany, assignors to Gevaert-Agfa N.V., Mortsel, Belgium

Filed May 31, 1968, Ser. No. 733,359
Claims priority, application Great Britain, June 16, 1967, 27,910/67
Int. Cl. G03c *1/84*
U.S. Cl. 96—84 R 9 Claims

A light-sensitive photographic material including a support and a light-sensitive layer and/or a water-permeable colloidal layer containing a dye obtained by condensation of para-aminobenzaldehydes or cinnamaldehydes with 1-phenyl-2-pyrazolin-5-ones which dyes are characterized by the presence in the 1-phenyl group of an arylsulphonyl substituent and by the presence in the dyestuff molecule of at least one carboxyl and/or sulpho group in acid or salt form are described. The photographic materials have improved light-screening properties.

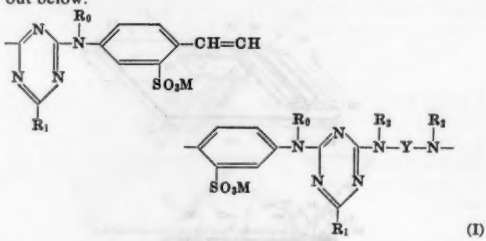
3,615,547

PHOTOGRAPHIC LIGHT SENSITIVE ELEMENTS, CONTAINING ULTRAVIOLET MATERIALS

Hiroyuki Amano; Fumihiko Nishio; Nobuo Tsuji, and Kazuo Shirasu, all of Kanagawa, Japan, assignors to Fuji Shashin Film Kabushiki Kaisha (now Fuji Photo Film Co., Ltd.), Kamigun, Kanagawa, Japan

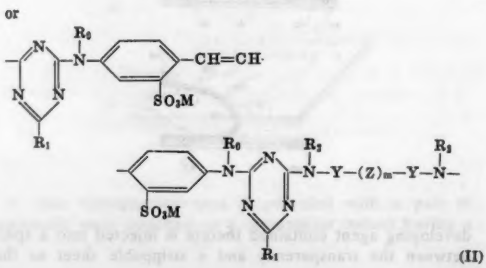
Filed Apr. 10, 1968, Ser. No. 720,344
Claims priority, application Japan, Apr. 10, 1967, 42/22756
Int. Cl. G03c *1/84*
U.S. Cl. 96—84 11 Claims

A photographic light-sensitive element containing an ultraviolet absorbent material which has improved resistance to ultraviolet rays, staining and an improved whitening effect, contains a high molecular weight compound having a repeating unit represented by one of the general formulas set out below:



(I)

or



(II)

in at least one photographic emulsion layer, intermediate layer, protective layer, subbing layer, backing layer, or a baryta layer. The representative letters such as R_o, M and the like are explicitly defined in the specification.

3,615,548

PHOTOGRAPHIC ELEMENTS BEARING LIGHT-ABSORBING LAYERS CONTAINING AN OXAZOLE STYRYL DYE AND A METAL CHELATE OF A FUCHSONE DYE

John Charles Firestine, South River, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 6, 1968, Ser. No. 758,099
Int. Cl. G03c *1/84*
U.S. Cl. 96—84 R **4 Claims**

A photographic element comprised of a support, a light-sensitive silver halide layer, and a filter layer or antihalation layer comprising an organic binder, an oxazoline styryl dye, and metal chelates of fuchsone-type dyes. The dye combinations are nonmigratory, stable, photographically inactive, and discharge completely in reversal processing.

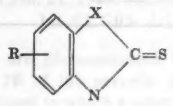
3,615,549

SILVER HALIDE PHOTOGRAPHIC PAPER WHICH PRODUCES WARM-TONED IMAGE COLOR AND METHOD OF MAKING IT

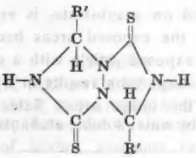
Yasushi Ohyama, Takatsuki-shi; Kiyoshi Futaki, Kyoto; Senji Tosa, Kyoto, and Yaichi Ishida, Kyoto, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Chiyoda, Tokyo, Japan

Filed Oct. 10, 1969, Ser. No. 865,486
Claims priority, application Japan, Oct. 14, 1968, 43/74196
Int. Cl. G03c *1/10*
U.S. Cl. 96—85 **10 Claims**

Process for the manufacture of a silver halide photographic paper which produces warm-toned image of from olive-brown to brown-black when developed and the tone of which is endurable against hot-drying of the finished print by employing two compounds having the following formulae:



and



3,615,550

WATER-RESISTANT OPAQUE PAPERS FOR PHOTOGRAPHIC PURPOSES

Gregor J. H. Kemme, Ruckert-Strasse, Germany, assignor to Felix Schoeller, Jr., Lustringen am Osnabruck, Germany

Filed Mar. 21, 1967, Ser. No. 624,736
Claims priority, application Germany, Mar. 31, 1966, Sch 38768
Int. Cl. G03c *1/86*
U.S. Cl. 96—85 **5 Claims**

The invention relates to opaque water-resistant papers and methods of making such papers suitable for use as base material for light-sensitive coatings for photographic purposes. According to the invention a sealing coat is applied to the paper base to prevent damage to the paper by application of the other coatings particularly aqueous or waterbound coatings.

3,615,551

PAPER BASE COATING CONTAINING CONDENSATI PRODUCT OF A POLYAMIDE AND EPICHLOROHYDRIN

Albert James Farnley, Watford, England, assignor to Cassio Photographic Paper Co. Ltd., Watford, Hertfordshire, England

Filed Jan. 2, 1969, Ser. No. 788,603
Claims priority, application Great Britain, Jan. 15, 1968, 2079/68
Int. Cl. G03c *1/86*
U.S. Cl. 96—85 **9 Claims**

The tendency for included optical brightening agent to wash out of photographic material consisting of paper base coated with a layer comprising baryta in a binder material, and with photographic emulsion, is reduced by including in the baryta layer a water-soluble condensation product of a polyamide and epichlorohydrin which will act to insolubilize the binder.

3,615,552

IMPROVED POLYETHYLENE-COATED PAPER PHOTOGRAPHIC MATERIAL

Justus Danhauser, Koeln-Stammheim; Peter Kruck, Koeln-Stammheim, and Werner Krafft, Leverkusen, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 12, 1969, Ser. No. 876,106
Claims priority, application Germany, Nov. 19, 1968, P 18 09 606.5
Int. Cl. G03c *1/86*
U.S. Cl. 96—85 **4 Claims**

The bonding between the hydrophobic surface of a polyethylene-coated paper and the hydrophilic colloids used as binders for light-sensitive photographic emulsions can be established by means of an intermediate layer combination which comprises a layer of polymeric carbonic acid esters immediately coated on the polyethylene surface of the paper and a bonding layer of mixed acetals of polyvinyl alcohol and aldehydes with and without water-solubilizing groups.

3,615,553

ALUMINUM PHOTOGRAPHIC SURFACES

Eugene Wainer, Shaker Heights, Ohio, assignor to Horizons Incorporated, a Division of Horizons Research Incorporated

Filed May 6, 1970, Ser. No. 35,262
Int. Cl. G03c *1/94*
U.S. Cl. 96—86 R **4 Claims**

The impregnation of an anodized layer on aluminum with silver salts is greatly improved and facilitated by supplying the soluble silver salt (used as the means for eventual formation of silver halide in the pores of the anodized aluminum) as a solution in which the solvent is a combination of a minor amount of water and a major amount of highly polar organic liquids in which alkali chlorides show low or very limited solubility. By use of this improved technique, a shelf stable photosensitive article is obtained which is capable of yielding deep, lustrous blacks on exposure and development without the need for gold toning to obtain such a result.

3,615,554

RETOUCHABLE PHOTOGRAPHIC FILMS FOR DUPLICATING

Haruo Takenaka; Teppei Ikeda; Toshiaki Okiyama, and Sueo Miyazaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Ashigara-Kamigun, Kanagawa, Japan

Continuation-in-part of application Ser. No. 564,840, July 13, 1966, now abandoned. This application Mar. 20, 1970, Ser. No. 21,500

Int. Cl. G03c *1/80*

U.S. Cl. 96—87 R 9 Claims

A retouchable photographic film for duplicating comprising a polyethylene terephthalate film, a mat layer strongly adhered to one or both surfaces of the polyester film, an undercoat formed by applying a gelatin-containing dispersion liquor onto the surface of a mat layer, and an emulsion layer containing a photosensitive silver salt or salts formed on the undercoat, said film being characterized by the use, in the formation thereof, of a swelling agent for the polyester film.

3,615,555

PHOTOGRAPHIC MATERIAL WITH NC-LAYER

Herbert Grabhofer, Koeln-Flittard, and Gunter Kolb, Koeln-Stammheim, both of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 19, 1970, Ser. No. 4,053

Claims priority, application Germany, Jan. 30, 1969, P 19 04 527.3

Int. Cl. G03c *1/88*

U.S. Cl. 96—87 R 3 Claims

A photographic material which has an NC-layer comprising an acrylamide copolymer.

3,615,556

HYDROPHOBIC FILM COATED WITH ACID-MODIFIED BUTADIENE COPOLYMER

Margaret Loudon Clachan, Manningtree, and Gordon Edmund Alfred Pears, London, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed June 2, 1969, Ser. No. 829,807

Claims priority, application Great Britain, June 24, 1968, 30,029/68

Int. Cl. G03c *1/78*; B32b *27/08*

U.S. Cl. 96—87 R 7 Claims

A hydrophobic film is coated with an ethylenically unsaturated carboxylic acid-modified butadiene copolymer. The coated film is coated with gelatin and/or light-sensitive gelatine silver halide emulsion layer.

3,615,557

PHOTOGRAPHIC FILMS COMPRISING AN ADHESIVE-SUBBING LAYER FOR A PHOTOGRAPHIC EMULSION

Alex Wasy D'Cruz, Somerset, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of application Ser. No. 547,154, May 3, 1966, now abandoned. This application Sept. 8, 1969, Ser. No. 856,194

Int. Cl. G03c *1/80*

U.S. Cl. 96—87 R 5 Claims

Photographic films comprising a biaxially oriented polyester film support having on at least one surface a thin layer of a tri-component copolymer of:

a. about 70 to 90 parts by weight of vinyl acetate,
b. about 7 to 40 parts by weight of a lower alkyl acrylate, and
c. about 3 to 30 parts by weight of an unsaturated acid of the group comprising itaconic acid, fumaric acid, acrylic acid or methacrylic acid, and carried by said layer a water-permeable colloid, silver halide emulsion layer. The novel copolymers are useful for substrata for drafting films. The substrata can contain pigments or dyes.

ERRATUM

For Class 96—88 see:
Patent No. 3,616,398

3,615,558

PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A FINELY DIVIDED PHTHALOCYANINE PIGMENT

Leonard M. Carreira, Webster, and Vsevolod Tulagin, Rochester, both of N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Continuation-in-part of application Ser. No. 384,737, July 23, 1964, now Patent No. 3,384,565, dated May 21, 1968. This application June 27, 1966, Ser. No. 560,603

Int. Cl. G03c *7/00*; B01k *5/00*

U.S. Cl. 96—88 10 Claims

Phthalocyanine pigments are used as electrically photosensitive particles in a photoelectrophoretic imaging system.

3,615,559

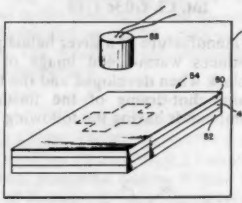
HYDROPHOBIC COMPOSITION RENDERED HYDROPHILIC BY PHOTON EXPOSURE

Alfred F. Kaspaul, and Erika E. Kaspaul, both of Malibu, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 1, 1968, Ser. No. 717,503

Int. Cl. G03c *1/00*, *5/00*

U.S. Cl. 96—88 3 Claims



A composition comprising a resinous film forming binder, a photoconductive or photoemissive material, e.g., ZnO, a metallic sensitization enhancing compound, e.g., CuCl, and a formaldehyde-water mixture, which composition is normally hydrophobic. An article, comprising the composition coated on a substrate, is exposed to suitable light where upon the exposed areas become hydrophilic. Treatment of the exposed article with a dye or pigment in water solution or suspension results in a usable pattern in accordance with the image areas. Selective etching of a metallic substrate by water soluble etchants is also disclosed.

3,615,560

METHODS OF MANUFACTURING PHOTOSENSITIVE MATERIALS

Hendrik Jonker, and Theodorus Petrus Gerardus Wilhelm Thijssens, both of Emmasingel, Eindhoven, Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.

Continuation of application Ser. No. 441,906, Mar. 22, 1965. This application Nov. 18, 1968, Ser. No. 781,688

Int. Cl. G03c *1/78*

U.S. Cl. 96—87 4 Claims

Provide a noncrystalline photosensitive layer on a nonsaponifiable nonwater-impregnable base. Between the base and photosensitive film there is sandwiched an adhesive containing an elastomer.

3,615,561

AQUEOUS COATING COMPOSITIONS FOR ADHERING LIGHT-SENSITIVE EMULSION TO POLYESTER FILM

Thomas J. Dolce, Scotch Plains, and Donald L. McCabe, Rahway, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Division of Ser. No. 637,348, May 10, 1967, Pat. No. 3,539,476. Filed May 6, 1970, Ser. No. 35,288
Int. Cl. G03c *1/80*
U.S. Cl. 96—87 R 5 Claims

An aqueous coating composition for adhering various types of layers to polyester sheet or film surfaces, the aqueous coating composition comprising a vinylidene chloride terpolymer, gelatin, and a copolymer of ethylene and vinyl acetate.

3,615,562

CYANINE DYE PHOTOGRAPHIC FILM

Sol E. Harrison, Huntington Valley, Pa., and Joel Goldmacher, Cranberry, N.J., assignors to RCA Corporation

Filed Apr. 25, 1968, Ser. No. 724,233
Int. Cl. G03c *1/72*
U.S. Cl. 96—89 6 Claims

A nonsilver direct printout photographic film comprises, in a plastic binder, a photobleachable merocyanine or cyanine dye and molecular oxygen with which the dye irreversably reacts.

3,615,563

DYE CYANIDES PHOTOACTIVATED BY INORGANIC SALTS

Lyman Chalkley, 6626 Tyrian St., La Jolla, Calif.

Filed Jan. 21, 1969, Ser. No. 792,851
Int. Cl. G03c *1/52*
U.S. Cl. 96—90 12 Claims

Dye cyanides are photoactivated by salts of metals of groups 1B and 2B of the periodic table of the elements. Systems are disclosed in which a solution of a dye cyanide in a nonphotoactivating solvent are made photoresponsive by the addition of a salt of a metal of group 1B or 2B. Also photographic sheet materials are described in which the incorporation of a salt of a metal of group 1B or 2B prevents the evolution of hydrogen cyanide during and after the photolysis of the dye cyanide sensitizer.

3,615,564

PHOTOGRAPHIC MEDIA CONTAINING AN IMPROVED AMINE ENHANCER SYSTEM

John Alan Mattor, Hollis, and Lawrence Price, Old Orchard Beach, both of Maine, assignors to The Scott Paper Company, Delaware County, Pa.

Continuation-in-part of application Ser. No. 641,720, Apr. 21, 1967, now abandoned, Continuation-in-part of application Ser. No. 626,720, Mar. 29, 1967, now abandoned, Continuation-in-part of application Ser. No. 351,316, Mar. 12, 1964, now abandoned. This application July 22, 1968, Ser. No. 746,254
Int. Cl. G03c *1/52*
U.S. Cl. 96—90 R 9 Claims

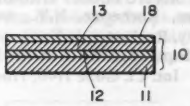
In a photographic medium containing a furfurylidene, an aromatic amine enhancer system and a lower haloalkane sensitizer, the use of an improved amine enhancer system consisting of a mixture of at least one aromatic amine and a polyhalo-substituted phenylenediamine results in improved heat and light stability, and greater shelf life.

3,615,565

PHOTOSENSITIVE ARTICLE AND METHOD OF USING SAME INCORPORATING LEUCO DYE PRECURSORS AND QUINONE ACTIVATORS

Joanne C. Gerlach, Watertown; Kenneth D. Jordan, Walpole, and Ian D. Robinson, Auburndale, all of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Filed May 8, 1969, Ser. No. 822,990
Int. Cl. G03c *1/52*
U.S. Cl. 96—90 27 Claims



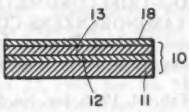
A direct printout photographic system suitable for photocopy work, particularly for microfilm blowups. A leuco base of a di- or triarylmethane, xanthene, thioxanthene, selenaxanthene, anthracene or acridine dye and a quinone activator, supported in a binder or distributed within a portion of a substrate, form the photosensitive system which is activated when exposed to a range of electromagnetic radiation extending from the ultraviolet through the visible spectrum. The system is adaptable to making monochrome and black-and-white prints and transparencies.

3,615,566

PHOTOSENSITIVE ARTICLE AND METHOD OF USING SAME INCORPORATING LEUCO DYE PRECURSORS AND FLUORESCEIN ACTIVATORS

Ian D. Robinson, Auburndale; Joanne C. Gerlach, Watertown, and Richard P. Muse, Cambridge, all of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Filed May 8, 1969, Ser. No. 832,540
Int. Cl. G03c *1/52*
U.S. Cl. 96—90 30 Claims



A direct printout photographic system suitable for photocopy work, particularly for microfilm blowups. A leuco base of a di- or triarylmethane, xanthene, thioxanthene, selenaxanthene, anthracene or acridine dye and a halogen-substituted fluorescein derivative activator, supported in a binder or distributed within a portion of a substrate, form the photosensitive system which is activated when exposed to a range of electromagnetic radiation extending from ultraviolet through the visible spectrum. The system is adaptable to making monochrome and black-and-white prints and transparencies.

3,615,567

PHOTOSENSITIVE ELEMENTS CONTAINING INORGANIC HALIDE IMAGE INTENSIFIERS

Howard Ivan Wilson, Towanda, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 20, 1969, Ser. No. 852,158
Int. Cl. G03c *1/70*
U.S. Cl. 96—90 R 8 Claims

A light-hardenable element comprising a preformed, compatible, coherent, film-forming macromolecular organic polymer, a free radical-producing hydrogen donor agent, an imidazolyl dimer and, optionally, a macromolecular organic polymer protective layer; and in intimate association therewith, a halide selected from the group consisting of

ammonium, barium, calcium, magnesium aluminum, mercuric, zinc, cobaltous, cuprous, and ferric chlorides; magnesium bromide and aluminum iodide are capable of producing enhanced visible images upon photolysis.

3,615,568

PHOTOSENSITIVE ELEMENTS CONTAINING PHOTOOXIDANTS CONTAINING HETEROCYCLIC NITROGEN ATOM SUBSTITUTED BY AN ALKOXY OR AN ACYLOXY GROUP

Philip W. Jenkins, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 18, 1969, Ser. No. 859,205
Int. Cl. G03c *1/40, 1/64*
U.S. Cl. 96—90 **20 Claims**

Novel photosensitive elements and compositions are described. The compositions contain (a) a colorless oxidizable nitrogen-containing organic color generator and (b) a photooxidant containing a heterocyclic nitrogen atom which is substituted by an alkoxy or an acyloxy group. When the photooxidant is exposed to actinic radiation, it causes the oxidation of the color generator to a colored material.

3,615,569

IMAGE STABILIZATION IN DIAZOSULFONATE PHOTOREPRODUCTION

Robert Charles Desjarlais, South Hadley Falls, Mass., assignor to The Plastic Coating Corporation, South Hadley, Mass.

Filed Nov. 28, 1969, Ser. No. 880,900
Int. Cl. G03c *1/56, 1/60*
U.S. Cl. 96—91 **6 Claims**

Inclusion of an amine salt of an aromatic carboxylic acid in a reversal diazosulfonate photosensitive composition prevents dye color-shift and background coloration.

3,615,570

DIAZO-3-TRIFLUOROMETHYL-4-TERTIARYAMINOBENZENE COMPOUNDS

Georg Werner, and Herbert Rauhut, both of Wiesbaden-Biebrich, Germany, assignors to Keuffel & Esser Company, Morristown, N.J.

Filed Feb. 24, 1966, Ser. No. 529,650
Claims priority, application Germany, Feb. 24, 1965, K 55375
Int. Cl. C07c *113/00*; C07d *29/00*; G03c *1/52*
U.S. Cl. 96—91 R **7 Claims**

Improved light sensitivity and dye forming coupling speed are obtained in one-component diazo-type copying material useful in preparing intermediate diazo-type reproducible copies through the use as the light-sensitive component a 1-diazo-3-trifluoromethyl-4-tertiary-amino-benzene compound.

3,615,571

METHOD OF CONTROLLING PHOSPHOR PH IN PROCESSING CRT

Douglas A. Griswold, Blossburg, Pa., and Robert A. Hotaling, Roanoke, Va., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 25, 1969, Ser. No. 802,240
Int. Cl. G03c *1/66*
U.S. Cl. 96—93 **1 Claim**

The pH of a phosphor is established at a desired nominal value by utilizing a sodium chloride-magnesium chloride flux material which results in optimum phosphor screen exposure time and optimum phosphor pattern adherence.

The pH of a slurry containing a sodium chloride-magnesium chloride flux phosphor is maintained at a desired value by the addition of ammonium hydroxide to the slurry.

3,615,572

ACIDIC SOLUTION OF PHENYLENEDIAMINE COLOR DEVELOPER AND SULFITE

Robert L. Bimmler, and Roy J. Kanous, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 19, 1967, Ser. No. 676,623
Int. Cl. G03c *7/00, 5/30*
U.S. Cl. 96—55 **8 Claims**

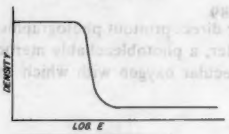
The stability of acidic solutions of phenylenediamine compounds and sulfite is enhanced by controlling the phenylenediamine:sulfite ratio.

3,615,573

DIRECT-POSITIVE COMPOSITION CONTAINING INDIVIDUALLY AND DIFFERENTLY FOGGED SILVER HALIDE EMULSIONS

Albert C. Smith, Jr., Rochester, N.Y., and Bernard D. Illingsworth, deceased, late of Rochester, N.Y. (by Mary D. Illingsworth, executrix), assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 9, 1968, Ser. No. 759,816
Int. Cl. G03c *1/02*
U.S. Cl. 96—94 **16 Claims**



This invention relates to direct-positive, photographic compositions. In one aspect, this invention relates to direct-positive, chemically fogged silver halide compositions having extended exposure latitude. In another aspect, this invention relates to direct-positive, silver halide compositions having the ability to produce discrete, high-contrast steps over the exposure range of the photographic composition.

3,615,574

THERMOGRAPHIC DIAZO-TYPE COPYING PAPER

Takehiko Iwaoka, Tokyo, and Tomiaki Asami, Kanagawa, both of Japan, assignors to Kabushiki Kaisha Ricoh, Ota-ku, Tokyo, Japan

Filed Mar. 8, 1968, Ser. No. 711,478
Int. Cl. G03c *1/60*
U.S. Cl. 96—91 **2 Claims**

A thermographic diazo-type copying paper which is prepared by applying, onto a support, a mixed solution containing a diazo compound, a coupler, an acid stabilizer and a thermally decomposable salt which has an alkali-generating ability, and further containing thiourea or a derivative thereof and a metal sulfate, and then drying the same, is of a highly improved shelf life and also provides a clear copied image which is highly increased in color density.

3,615,575

TWO-COMPONENT BLACK-LINE DIAZO-TYPE MATERIAL

Herbert Rauhut, Wiesbaden-Biebrick, Germany, assignor to Keuffel & Esser Company, Hoboken, N.J.

Filed July 30, 1968, Ser. No. 748,650
Claims priority, application Germany, July 31, 1967, P 15 97 619.9
Int. Cl. G03c *1/58*
U.S. Cl. 96—91 **9 Claims**

Diazo-type material useful in the preparation of neutral black copies and having improved storage stability includes, with a p-phenylene-diamine light-sensitive diazonium compound, a blue-coupler and a yellow-coupler which is a bis-cyanoacetic-amide.

3,615,576

CLEARING IN REVERSAL DIAZOSULFONATE PHOTOREPRODUCTION

Robert Charles Desjarlais, South Hadley Falls, Mass., assignor to The Plastic Coating Corporation, South Hadley, Mass.

Filed Nov. 28, 1969, Ser. No. 880,899
Int. Cl. G03c *1/56, 1/60*
U.S. Cl. 96—91 R 6 Claims

Inclusion of an alkali metal iodide, fluoroborate, fluorophosphate, or thiocyanate in a reversal diazosulfonate photoimaging formulation improves clearing.

3,615,577

PREVENTION OF INACTIVATION OF COUPLING COMPONENTS IN REVERSAL DIAZOSULFONATE PHOTOREPRODUCTION MATERIAL

Robert Charles Desjarlais, South Hadley Falls, Mass., assignor to The Plastic Coating Corporation, South Hadley, Mass.

Filed Nov. 28, 1969, Ser. No. 880,901
Int. Cl. G03c *1/56, 1/60*
U.S. Cl. 96—91 R 6 Claims

A reversal diazosulfonate composition and photoreproduction material containing N,N' diaryl-substituted alkylene diamines and humectants to prevent inactivation of coupling components.

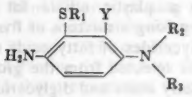
3,615,578

LIGHT-SENSITIVE DIAZO COMPOUNDS AND LIGHT-SENSITIVE MATERIAL CONTAINING THEM

Adrianus Marie Petrus Hectors, and Hubertus Johannes Wilhelmus Pecasse, both of Venlo, Netherlands, assignors to Van Der Grinten N.V., Venlo, Netherlands

Filed June 13, 1968, Ser. No. 736,576
Claims priority, application Netherlands, June 19, 1967, 6708503
Int. Cl. G03c *1/52*; C07c *113/04, 113/00*
U.S. Cl. 96—91 16 Claims

Light-sensitive diazo compounds of a new class are prepared by diazotizing aromatic amines of the formula



in which R_1 is an alkyl, aralkyl or aryl group, Y is a fluorine, chlorine or bromine atom, and

is a tertiary amino group that may be a saturated heterocylic ring. Light-sensitive material (papers, planographic printing plates, etc.) sensitized with salts of these compounds, e.g., with a 4-dialkylamino-3-halo-2-alkylthiobenzene diazonium salt or a 4-dialkylamino-3-halo-2-(4'-methylphenylthio)-benzene diazonium salt, are developable by reaction with aromatic polyvalent phenols to form dark-colored azo dyestuff images having improved water-fastness and background contrast.

3,615,579

PROCESS FOR MAKING LIGHT-DEVELOPABLE DIRECT-WRITING SILVER HALIDE EMULSIONS CONTAINING RHODIUM OR IRIDIUM

John Howard Bigelow, Rochester, N.Y., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed June 22, 1967, Ser. No. 647,909
Int. Cl. G03c *1/02, 1/28*
U.S. Cl. 96—94 7 Claims

Process for preparing light-developable, direct-writing silver halide emulsions, e.g., emulsions for oscillograph recording elements which comprises digesting such an emulsion in the presence of a rhodium or iridium salt at pH below 6.0 and then adding a halogen acceptor.

3,615,580

PHOTOGRAPHIC COMPOSITIONS AND PROCESSES FOR MAKING SAME

Richard W. Karlson, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 9, 1968, Ser. No. 766,322
Int. Cl. G03c *1/06*
U.S. Cl. 96—94 R 12 Claims

Photographic silver-halide emulsions comprising silver-halide grains which have been formed in the presence of a water-soluble nitrite. In one aspect, photographic silver-halide emulsions comprising said grains provide improved direct-print emulsions. In another aspect, this invention relates to a process for improving the photographic properties of a direct-print composition by adding water-soluble nitrites to the precipitation medium wherein the silver-halide grains are formed.

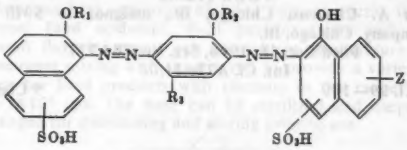
3,615,581

PHOTOGRAPHIC MATERIAL FOR THE SILVER DYE BLEACH PROCESS

Karlheinz Kabitzke, Cologne-Buchheim; Horst Nickel, Leverkusen; Justus Danhauser, Cologne-Buchheim, and Erich Bockly, Leverkusen, all of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed May 14, 1968, Ser. No. 728,886
Claims priority, application Germany, May 22, 1967, A55771
Int. Cl. G03c *1/10*
U.S. Cl. 96—99 11 Claims

Very effective cyan dyes for photographic silver dye bleach process have the formula



3,615,582

PHOTOGRAPHIC MATERIALS FOR THE SILVER DYE BLEACH PROCESS

Hans Vetter, Cologne, Stammheim; Karl-Heinz Freytag, Leverkusen; Justus Danhauser, Cologne, Stammheim, and Erich Bockly, Leverkusen, all of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 22, 1968, Ser. No. 778,294
Claims priority, application Germany, Dec. 13, 1967, P 15 97 504.9
Int. Cl. G03c *1/40*
U.S. Cl. 96—99 12 Claims

The provision in a light-sensitive silver-dye-bleach silver halide emulsion of a bis-azo dye which is a light fast yellow dye compatible with photographic layers to provide uniform distribution and having brilliant spectral properties by resisting side absorption.

ERRATA

For Classes 99—108 thru 99—140 see:
Patent Nos. 3,615,583 thru 3,615,601

ERRATUM

For Class 96—109 see:
Patent No. 3,615,721

3,615,583

METHOD OF PREPARING A WHIPPED MEAT FOOD COMPOSITION AND PRODUCT PRODUCED THEREBY

John C. Bard, and Roman A. Carpenter, both of Madison, Wis., assignors to Oscar Mayer & Company, Inc., Chicago, Ill.

Filed May 19, 1969, Ser. No. 825,927
Int. Cl. A22c *18/00*
U.S. Cl. 99—108 2 Claims

A whipped meat food product is prepared by intimately blending together in uniform distribution and admixture solid

and liquid ingredients including: (1) comminuted meat such as sausage emulsion or meat which constitutes the principal ingredient; (2) water, and animal and/or vegetable fat, which accounts for the major portion of the balance, and, (3) seasoning or flavoring ingredients including stabilizers constituting less than 10 percent by weight of the total formulation. The blended formulation is preferably pasteurized and homogenized and then chilled, after which sufficient edible gas is incorporated throughout the formulation to increase its volume by at least 15 percent and preferably by at least 20 percent.

3,615,584

METHOD OF PREPARING COMMINUTED POULTRY PRODUCT

Kermit F. Schlamb, and Eugene Bortsky, both of Pittsburgh, Pa., assignors to Calgon Corporation

Continuation-in-part of application Ser. No. 758,588, Sept. 9, 1968, now abandoned. This application Oct. 1, 1969, Ser. No. 862,933

Int. Cl. A22c *21/00*

U.S. Cl. 99—108 **4 Claims**

A formed poultry product comprising residual deboned comminuted poultry meat about 0.25 to 1 percent by weight of molecularly dehydrated phosphate and about 0.5 to about 2 percent by weight sodium chloride and a method of preparing the same.

3,615,585

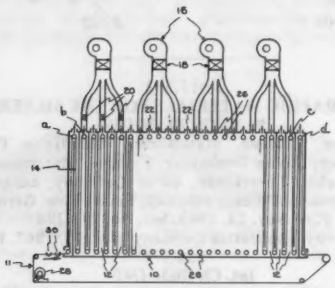
METHOD FOR HEAT PROCESSING SAUSAGE-TYPE FOOD ITEMS

Ogden A. Clemens, Chicago, Ill., assignor to Swift & Company, Chicago, Ill.

Filed Dec. 18, 1968, Ser. No. 784,737

Int. Cl. A22c *11/00*

U.S. Cl. 99—109 **9 Claims**



A method for heat processing a plurality of items, such as sausages sequentially produced during a single batch or work shift, through a longer treatment involves transporting such items along a serpentine path through plural zones until the first item nearly reaches the end of the path and the last item has entered the path, whereupon the movements of the items are cyclically reversed and the conditions in the zones are sequentially equalized, whereafter the items are further transported and discharged from the end of the last zone.

3,615,586

PREPARING PROCESS CHEESE

Hans-Adolf Rohlfs, Heidelberg; Wilhelm Koch, Ludwigshafen-Maudach, and Guenther Scheurer, Hassloch, Pfalz, all of Germany, assignors to Benckiser-Knapsack GmbH, Ludwigshafen (Rhine), Germany

Filed June 6, 1968, Ser. No. 734,879

Claims priority, application Germany, June 13, 1967, B 92974

Int. Cl. A23c *19/00*

U.S. Cl. 99—115 **14 Claims**

Process cheese and pasteurized process cheese of superior texture, aroma, and keeping qualities are prepared by melting the starting cheese with a suitable melting salt and a phosphate-modified starch as thickening agent. The amounts of phosphatesmodified starch in such process cheese products are between about 0.5 and 3.0 percent and preferably between 1.0 and 2.5 percent and the total amount of melting salt and phosphate-modified starch between about 2.0 and 5.0 percent and preferably between about 2.5 and 4.0 percent

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3,615,587

METHOD OF PRODUCING CHEESE

Hans Koopmans, A. H. van de Venstraat 16, Bolsward, Netherlands

Filed Sept. 5, 1968, Ser. No. 757,633

Claims priority, application Netherlands, Sept. 5, 1967, 6712133

Int. Cl. A23c *19/02*

U.S. Cl. 99—116 **11 Claims**

A method of making cheddar or similar cheese by a continuous process including the steps of cheddaring, flavoring, and homogenizing by precompressing the usual milled and salted curds under relatively high pressure for a short period of time, spraying them with hot water and subjecting them to a final compression at high pressure for a short period of time, before the process of curing.

3,615,588

GLYCERIDE MIXTURE AND PLASTIC EDIBLE FATS PREPARED THEREFROM

Christian Heine, Monheim, Rhineland, and Werner Stein, Erkrath-Unterbach, both of Germany, assignors to Henkel & Cie GmbH, Dusseldorf-Holthausen, Germany

Filed July 2, 1968, Ser. No. 741,879

Claims priority, application Germany, July 28, 1967, H 63430

Int. Cl. A23d *5/00*

U.S. Cl. 99—118 R **11 Claims**

This invention relates to a glyceride mixture suitable for transformation into a plastic edible fat having a wide plasticity range comprising a mixture of from 93 percent to 100 percent of triglycerides of fatty acids and from 0 to 7 percent of glycerides selected from the group consisting of monoglycerides of fatty acids and diglycerides of fatty acids wherein said glyceride mixture contains from 90 percent to 60 percent of oily glycerides and from 10 percent to 40 percent of hard glycerides where said hard glycerides contain from 10 percent to 75 percent of triglycerides which melt at from 30° C. to 45° C. and which have one unsaturated and two saturated fatty acid moieties per molecule, from 90 percent to 25 percent of glycerides which melt at from 48° C. and 60° C. and which have at least one myristic acid moiety per molecule, and from 0 to 12 percent of glycerides which melt above 60° C. The invention also relates to the process of transforming said glyceride mixture into a plastic edible fat having a wide plasticity range and to the plastic edible fat so produced.

3,615,589

METHOD OF SUBDIVIDING WATER THIN BULK FOOD MATERIAL

Paulus Jacob Spek, Didam, Netherlands, assignor to Lever Brothers Company, New York, N.Y.

Continuation-in-part of application Ser. No. 629,412, Apr. 10, 1967, now abandoned. This application Feb. 27, 1970, Ser. No. 15,215

Int. Cl. A23l *1/34*, *1/40*

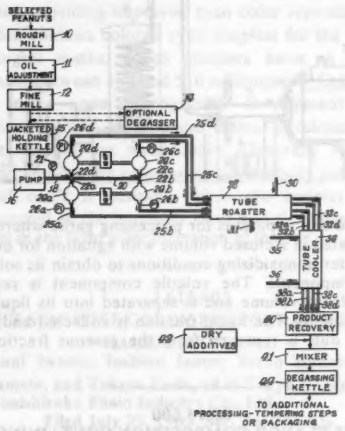
U.S. Cl. 99—124 **10 Claims**

A method of subdividing bulk food material into portions, said bulk food material comprising a mixture of liquid and particulate solid components which would tend to separate on standing, wherein the homogeneity of said mixture is maintained during the subdividing step by employing a suitable thickening agent which is subsequently decomposed.

3,615,590
PROCESSES FOR MAKING ROASTED NUT PRODUCTS FROM RAW, BLANCHED NUTS

Fitzhugh L. Avera, Alameda; Frank G. Delfino, Castro Valley; George E. Johnson, Sausalito, and Roy L. Kelly, Tarzana, all of Calif., assignors to CPC International Inc.

Filed Oct. 24, 1967, Ser. No. 677,648
Int. Cl. A23l *1/38*
U.S. Cl. 99—128 17 Claims



This application covers a nut butter that is characterized by full-bodied roast flavor of enhanced intrinsic uniformity and that possesses enhanced flavor and aroma, and that is characterized by enhanced freedom from heat and oxidative deterioration. The process involves grinding shelled, raw, blanched nuts to form a slurry, passing the slurry through a confined zone such as a tubular heat exchanger, heating the slurry to roast it and then cooling it within the heat exchanger, and recovering the product. The moisture content of the slurry, and the pressure and temperature within the tubular heat exchanger, may be controlled so that the product that is recovered from the heat exchanger may be solid comprising a dispersion of oil in agglomerated particles of nut solids. This can be consumed as such, or coated with candy coatings such as chocolate, or it may be subjected to mixing or shearing to convert it to the butter product.

3,615,591
METHOD OF MAKING A PEANUT BUTTER—JELLY PRODUCT

Harrison E. Newlin, Prairie Village, Kans., and Marvin C. Keck, Greenville, Ill., assignors to Pet Incorporated, St. Louis, Mo.

Filed Oct. 21, 1968, Ser. No. 769,359
Int. Cl. A23l *1/38*
U.S. Cl. 99—128 6 Claims

A method of making a stable and compatible peanut butter—jelly product so that not only is there no whitening or dark color penetration in the peanut butter, but also there is no surface discoloration of the peanut butter at the peanut butter—jelly interface.

3,615,592
INCORPORATING FAT IN MARSHMALLOW

Marvin A. Peterson, Park Ridge, Ill., assignor to Beatrice Foods Co., Chicago, Ill.

Filed Mar. 27, 1968, Ser. No. 716,317
Int. Cl. A23g *3/00*
U.S. Cl. 99—134 13 Claims

Polyglycerol higher fatty acid partial esters, preferably polyglycerol partial stearates, are employed to emulsify a marshmallow mixture. The use of such emulsifier permits the addition of fat. The polyglycerol partial stearates permit the aeration of the mixture in a warm system. The aerated marshmallow mixture can be blended or layered with peanut butter, e.g. by swirling or layering horizontally or vertically to produce a product having reduced migration of water from the marshmallow to peanut butter.

3,615,593
METHOD FOR PREPARING AERATED CONFECTIONARY

Arvind Shankar Patil, Silver Spring, Md., assignor to W. R. Grace Co.

Filed July 18, 1969, Ser. No. 843,102
Int. Cl. A23g *3/00*
U.S. Cl. 99—134 4 Claims

An aerated confectionary product prepared by heating hard malted-milk taffy confectionary balls to a softening point without substantial deformation after which the softened malted-milk taffy confectionary balls are cooled to case harden the surfaces. Thereafter, the malted-milk taffy confectionary balls having hardened surfaces and softened centers are vacuum expanded.

3,615,594
VARIEGATING SAUCE BASE

Aubrey P. Stewart, Jr., 801 Grove Ave., and Jim C. Gregory, 17th & Grove, both of Corning, Iowa

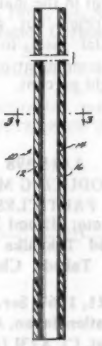
Filed May 13, 1968, Ser. No. 728,828
Int. Cl. A23g *5/00*; A23l *1/04, 1/06*
U.S. Cl. 99—136 5 Claims

Aqueous base consisting of 1.5–3 percent pectin, 0.6–1.2 percent food acidulant, 8–21 percent sugar and 15–25 percent flavoring agent gels at ambient temperature upon subsequent mixing with sugar syrup to provide a variegating sauce for food products with viscosity in the range 8×10^4 cps–1×10^5 cps. The base can be sterilized and aseptically packaged for distributing and storing prior to use.

3,615,595
FLAVORED DRINKING STRAW

Alvin Guttag, Bethesda, Md., assignor to National Patent Development Corporation, New York, N.Y.

Filed Apr. 8, 1969, Ser. No. 814,271
Int. Cl. A23l *1/26*
U.S. Cl. 99—138 R 11 Claims



A tubular drinking straw having at least a portion of an exposed wall formed of a water insoluble hydrophilic acrylate or methacrylate polymer. A water soluble flavoring agent is dispersed within the polymer and passes by way of the polymer to flavor the liquid in which the straw is placed.

3,615,596
WRITING ACCESSORY
Albert F. Petti, 421 Lexington Ave., Cranford, N.J., and Louis J. Perrotti, 419 Morristown Road, Linden, N.J.
Filed Dec. 4, 1969, Ser. No. 882,114
Int. Cl. A23g 3/00
U.S. Cl. 99—138 5 Claims

A writing accessory comprising an elongated holder member having a hard candy comestible affixed to one end. The other end of the holder member has a socket formation for reception of the free end of a writing implement.

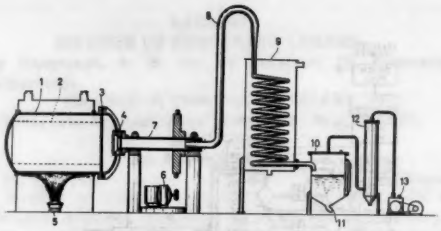
3,615,597
SOLID FOOD CONDIMENT
Jack R. Durst, Osseo, and Merlin J. Sletten, St. Paul, both of Minn., assignors to The Pillsbury Company, Minneapolis, Minn.
Filed Mar. 10, 1967, Ser. No. 622,036
Int. Cl. A23l 1/22
U.S. Cl. 99—140 R 14 Claims

Compact, solid food condiment pieces which are resistant to physical, chemical and bacteriological degradation are provided by a unitary, solid condiment piece consisting essentially of a matrix comprised of a hydrophilic film former, water and an edible humectant and at least one edible condiment uniformly distributed within the matrix. The condiment is present in the matrix in an amount greater than incidental impurities but sufficient to impart a pronounced condimental taste to the condiment piece. Moisture level for the condiment pieces is less than 20 but more than about 7 weight percent.

3,615,598
METHOD FOR PRODUCING MIXED CONDIMENT PARTICLES
Yoshiro Funakoshi, Kyoto; Hiromi Nakatani, Kyoto; Tatsuo Asogawa, Osaka, and Takehiko Kajiura, Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan
Filed Apr. 21, 1967, Ser. No. 632,601
Claims priority, application Japan, Apr. 22, 1966, 41/25774
Int. Cl. A23l 1/22
U.S. Cl. 99—140 N 4 Claims

Method for producing a powdery-flavor-coated powdery-condiment particle comprising (1) wetting the surface of a powdery condiment material with water or a hydrophilic solvent, (2) contacting the wetted particle with a second powdery condiment material (3) causing the second material to adhere to the wetted particle by drying the mixture with a hot gas of controlled temperature and humidity whereby a uniformly coated condiment particle is formed. Materials used as flavors or condiments include sodium chloride, 5-nucleotides and amino acids.

3,615,599
METHOD OF AND APPARATUS FOR PROCESSING GARLIC
Yoshizo Sakamoto, and Kazuyasu Sakamoto, both of 1166 Oaza Shimootome, Yokkaichi-Machi, Usa-gun, Japan
Filed May 1, 1967, Ser. No. 635,099
Claims priority, application Japan, May 17, 1966, 41/31289
Int. Cl. A23l 1/22; A23b 7/02
U.S. Cl. 99—140 R 5 Claims



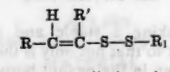
A method and apparatus for processing garlic wherein the garlic is heated in a closed volume with agitation for uniform heating under nonoxidizing conditions to obtain its solid and volatile components. The volatile component is removed from the closed volume and is separated into its liquid and gaseous fractions. The liquid fraction is collected and at the same time dust is removed from the gaseous fraction and collected.

3,615,600
MEAT FLAVOR COMPOSITION CONTAINING SUCCINIC ACID
Christiaan Herman Theodoor Tonsbeek, Zevenaar, Netherlands, assignor to Lever Brothers Company, New York, N.Y.
Filed Jan. 18, 1968, Ser. No. 698,718
Claims priority, application Netherlands, Jan. 20, 1967, 6700991
Int. Cl. A23l 1/22
U.S. Cl. 99—140 N 11 Claims

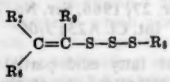
Artificial flavoring mixtures which can impart a meaty flavor to foods. The mixtures contain an amino acid including glutamic acid, a nucleotide and critical amounts of succinic acid and a hydroxycarboxylic acid including lactic acid.

3,615,601
ALKYL 1-ALKENYL DI- AND TRISULFIDE COMPOUNDS AND FLAVORING COMPOSITIONS CONTAINING THE SAME
Michael Hugo Brodnitz, Matawan, N.J., assignor to International Flavors & Fragrances, Inc., New York, N.Y.
Filed Apr. 26, 1968, Ser. No. 724,612
Int. Cl. A23l 1/22
U.S. Cl. 99—140 R 7 Claims

Novel compounds have been discovered which impart cooked onion flavor and aroma to foods treated therewith. Said novel compounds are alkyl-alkenyl disulfides having the formula:



wherein R′ is hydrogen or alkyl and R and R_1 are alkyl. Representative compounds are methyl propenyl disulfide, propyl propenyl disulfide, and ethyl propenyl disulfide. Compositions containing said compounds preferably at levels of from 0.01 to 20 percent by weight are also disclosed. Additionally, said compositions may contain other disulfides and trisulfides including novel alkenyl trisulfides having the formula:



wherein R_7 and R_8 are alkyl groups and R_6 and R_9 are hydrogen or alkyl.

3,615,602

COLOR-PHOTOGRAPHIC SILVER HALIDE EMULSION, CONTAINING COLORED CYAN-FORMING COUPLERS

Hans-Heinrich Credner, Munich, and Wolfgang Muller-Bardorff, Cologne, both of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 9, 1968, Ser. No. 696,508
Claims priority, application Germany, Jan. 18, 1967, A54648
Int. Cl. G03c 1/40
U.S. Cl. 96—100 7 Claims

This invention relates to a photographic silver halide emulsion providing improved cyan color reproduction. The emulsion contains colored cyan couplers for the production of integral masks, which couplers have an absorption maximum between 490 and 510 millimicrons. Color couplers which react upon photographic development with the oxidation product of aromatic amino developers to form colored images are well known. Generally these color-forming couplers are colorless or substantially colorless. This lack of color is desirable when the coupler is to be incorporated in the emulsion layer and the unused coupler remains in the layer after formation of the dye.

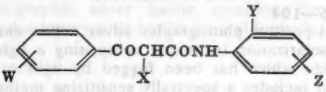
3,615,603

LIGHT-SENSITIVE COLOR-PHOTOGRAPHIC SILVER HALIDE MATERIAL

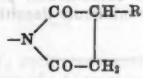
Masakuni Iwama; Isaburo Inoue; Teruo Hanzawa; Kenro Sakamoto, and Takaya Endo, all of Tokyo, Japan, assignors to Konishiroku Photo Industry Co., Ltd.

Filed July 29, 1968, Ser. No. 748,236
Claims priority, application Japan, July 27, 1967, 42/47871
Int. Cl. G03c 1/40
U.S. Cl. 96—100 8 Claims

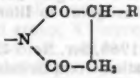
A yellow-forming component or color coupler for use in silver halide emulsions in light-sensitive color photography has the general formula



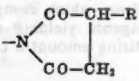
wherein X is a hydrogen atom or a halogen atom; Y is a hydrogen atom, a lower alkoxy group, an aryloxy group or a halogen atom; W is



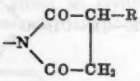
a hydrogen atom or a lower alkoxy group; and Z is



a hydrogen atom or a lower alkoxycarbonyl group, provided either one of z and w is always



and both of them cannot be



at the same time. R is an aliphatic hydrocarbon residue having eight to 20 carbon atoms.

3,615,604

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL CONTAINING CYAN-FORMING COLOR COUPLER

Friedrich-Wilhelm Kunitz, Leverkusen; Willibald Pelz, Opladen; Erich Bockly, Leverkusen, all of Germany, and Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 18, 1969, Ser. No. 800,245
Claims priority, application Germany, Mar. 2, 1968, P 16 22 920.2
Int. Cl. G03c 1/40
U.S. Cl. 96—100 4 Claims

Color couplers of novel structure that form cyan images in photographic silver halide emulsions and are highly stable as well as produce more stable and more light-fast images.

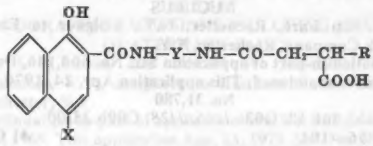
3,615,605

LIGHT-SENSITIVE SILVER HALIDE COLOR-PHOTOGRAPHIC MATERIAL CONTAINING NAPHTHAL COLOR COUPLERS

Isabro Inoue; Shui Sato, and Yutaka Takei, all of Tokyo, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Mar. 19, 1968, Ser. No. 714,336
Claims priority, application Japan, Mar. 22, 1967, 42/17373
Int. Cl. G03c 1/40
U.S. Cl. 96—100 6 Claims

Light-sensitive silver halide color-photographic emulsions comprising cyan couplers of the formula:



wherein X is hydrogen, halogen, sulfonic or sulfonate groups, Y is $-(CH_2)_3-$ or $-CH_2-CH(CH_3)-$ and R is an aliphatic hydrocarbon radical of eight to twenty carbon atoms.

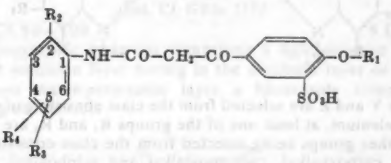
3,615,606

COLORPHOTOGRAPHIC MATERIAL

Walter Schulte, Opladen; Helmut Mader, Leverkusen; Willibald Pelz, Opladen; Fritz Nittel, Cologne, Stammheim, and Erich Reckziegel, Leverkusen, all of Germany, assignors to AFGA Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed July 2, 1968, Ser. No. 741,880
Claims priority, application Germany, July 10, 1968, A 56235
Int. Cl. G03 1/40
U.S. Cl. 96—100 9 Claims

A light-sensitive photographic material containing in a silver halide emulsion layer a yellow coupler of the following formula:



in which

R_1 represents an alkyl radical;

R_2 represents an alkoxy radical, an alkylthio radical, a secondary or tertiary alkylamino group, a halogen, an alkyl radical, arylthio;

R_3 represents a substituent in the 4- or 5-position, which is: sulfonamide, carbamoyl, acylamino, an alkylsulfonyl;

R_4 represents hydrogen, an alkyl or alkoxy radical, halogen, sulfonamide or carbamoyl alkyl or alkylsulfonyl.

3,615,607

METHOD OF DESENSITIZING LIGHT-SENSITIVE SILVER HALIDE PHOTOGRAPHIC MATERIALS WITH CYCLOHEPTIMIDAZOLE DERIVATIVES

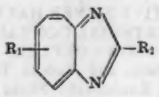
Nobuo Soma, Tokyo; Mitsuo Watatani, deceased, late of Tokyo (by Takako Watatani, heir); Junichi Nakazawa, Tokyo; Yoshio Sato, Tokyo; Yoshimi Kuwabara, Tokyo, and Hidehiko Ishikawa, Kanagawa, all of Japan, assignors to Sankyo Co., Ltd. and Konishiroku Photo Industry Co., Tokyo, Japan

Division of Ser. No. 622,475, Mar. 13, 1967. Filed Apr. 13, 1970, Ser. No. 28,084

Int. Cl. G03c *1/36*

U.S. Cl. 96—101 **13 Claims**

Light-sensitive silver halide photographic materials are desensitized by treatment with a compound of the formula



wherein R_1 is hydrogen, lower alkyl, halogen, cyano or dialkyl amino and R_2 is aryl or pyridinium which may or may not be substituted.

3,615,608

SILVER HALIDE EMULSIONS CONTAINING CYANINE AND MEROCYANINE DYES HAVING A 4-PYRAZOLE NUCLEUS

Earl J. Van Lare, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 604,146, Dec. 23, 1966, now abandoned. This application Apr. 24, 1970, Ser. No. 31,780

Int. Cl. G03c *1/36, 1/28;* **C09b** *23/00*

U.S. Cl. 96—101 **41 Claims**

Silver halide emulsions are provided which feature certain cyanine and merocyanine dyes containing a 4-pyrazole nucleus.

3,615,609

SUPERSENSITISING DYES

Douglas James Fry; Geoffrey Ernest Ficken; Ronald William Burrows, and Simon Lindsay Scrutton, all of Ilford, England, assignors to Ilford Limited, Ilford, Essex, England

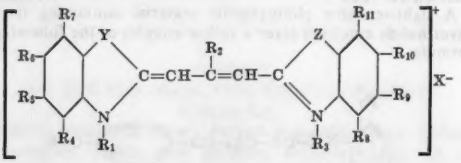
Filed Sept. 12, 1966, Ser. No. 578,481

Claims priority, application Great Britain, Sept. 23, 1965, 40620/65

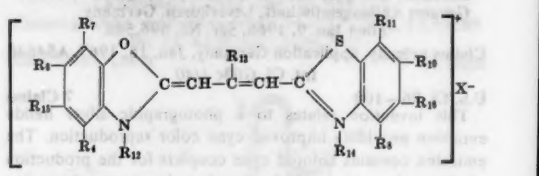
Int. Cl. G03c *1/28, 1/18*

U.S. Cl. 96—104 **12 Claims**

Photographic silver halide emulsions containing a supersensitizing combination comprising a dye of the formula:



where Y and Z are selected from the class consisting of sulfur and selenium, at least one of the groups R_1 and R_3 are alkyl, the other groups being selected from the class consisting of alkyl, carboxyalkyl, carbamoylalkyl and sulphoalkyl, R_2 is selected from the class consisting of hydrogen and alkyl, at least one of the groups R_5 and R_9 is a thienyl group, the other groups R_5 and R_9 being selected from the class consisting of hydrogen, halogen, alkyl, aryl, hydroxy and alkoxy groups and together with either R_4 or R_8, depending on whether R_5 or R_9 carries the thienyl substituent group form part of a benzene ring, R_4 and R_8 taken separately each represent a hydroxy atom, R_6 and R_{10} taken separately are each selected from the class consisting of a hydrogen atom, a halogen atom, an alkyl, aryl, hydroxy and alkoxy groups, R_7 and R_{11} taken separately each represent a hydrogen atom, R_6 and R_7 taken together form part of a benzene ring, R_{10} and R_{11} taken together form part of a benzene ring and X is an anion, together with a dye of the formula:



where R_4, R_6, R_7, R_8, R_{10}, R_{11} and X have the meanings assigned to them above, R_{12} is an alkyl group, R_{13} is selected from the same class consisting of hydrogen and alky, R_{14} is selected from the class consisting of an alkyl group and a group A-Q where A is selected from the class consisting of straight and branched alkylene chains containing 1 to 6 carbon atoms and Q is selected from the class consisting of an amide, a carbonyl, and a sulfonic acid group, R_{15} and R_{16} are each selected from hydrogen, halogen, alkyl, aryl, alkoxy and hydroxy groups. A third dye may also be used in the combination.

3,615,610

SILVER HALIDE DIRECT POSITIVE EMULSIONS SPECTRALLY SENSITIZED WITH A COMBINATION OF A DESENSITIZING DYE WITH A 2-PHENYLINDOLE METHINE DYE

Raymond Leopold Florens, Edegem, Belgium; Johannes Gotze, Bergisch-Neukirchen; August Randolph, Leverkusen, Germany, and Theofiel Hubert Ghys, Kontich, Belgium, assignors to Gevaert-AGFA N.V., Mortsel, Belgium

Filed May 2, 1967, Ser. No. 635,358

Claims priority, application Great Britain, May 9, 1966, 20,343/66

Int. Cl. G03c *1/28*

U.S. Cl. 96—104 **6 Claims**

A direct-positive photographic silver halide emulsion for use in a solarization technique comprising a light-sensitive silver halide which has been fogged by light or chemical means and includes a spectrally sensitizing methine dye of the 2-phenylindole type in combination with a desensitizing nitrostyryl or nitrobenzylidene dye is described. In contrast to a direct-positive photographic silver halide emulsion containing only the 2-phenylindole type dye or nitrostyryl or nitrobenzylidene dye, the combination provides improved stability on storage, lower minimum densities, and increased total speed.

3,615,611

PHOTOGRAPHIC EMULSIONS

Konrad Jerzy Bannert, and Douglas James Fry, both of Ilford, Essex, England, assignors to Ilford Limited, Essex, England

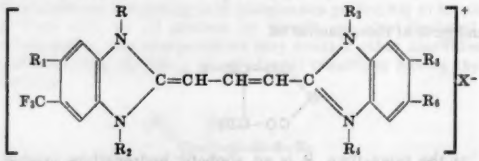
Filed July 2, 1968, Ser. No. 741,854

Claims priority, application Great Britain, July 4, 1967, 30,778/67

Int. Cl. G03c *1/10*

U.S. Cl. 96—106 **3 Claims**

This application describes a green sensitive gelatino silver halide photographic emulsion which comprises, substantive thereto, at least one magenta yielding color former and which comprises in sensitizing amount a cyanine dye of the general formula:



wherein R_1 represents a halogen atom or a lower alkyl or amino group, R and R_3 are the same or different and

represent lower alkyl groups containing at least two carbon atoms, one of R_2 and R_4 is a sulphoalkyl group of the formula $-(CH_2)_nSO_3H$ where n is an integer from 1 to 6, and the other of R_2 and R_4 is the same or different said sulphoalkyl group or is an alkyl, hydroxyalkyl, aralkyl, carboxy-substituted aralkyl, or carboxy-substituted alkyl group, an acylsulphamoyl alkyl group of the formula $-(CH_2)_nSO_2NHCOR_8$, or an alkyl or aralkyl sulfamoyl alkyl group of the formula $-(CH_2)_nSO_2NHR_9$ where n in the last two formulas is an integer from 1 to 6, R_8 is an alkyl group and R_9 is an alkyl or an aralkyl or amino group, R_5 represents a hydrogen or halogen atom or an alkyl or amino group, R_6 represents a hydrogen or halogen atom or a trifluoromethyl, cyano or alkoxycarbonyl group, and X is an anion.

3,615,612

PHOTOGRAPHIC ELEMENT CONTAINING A PHOSPHORIC ACID ESTER OF A BUTYNEDIOL-ALKYLENE OXIDE CONDENSATE

E. Scudder Mackey, Binghamton, N.Y.; Fritz Dersch, Binghamton, N.Y., and Fred S. Eiseman, Maplewood, N.J., assignors to GAF Corporation, New York, N.Y.

Filed Jan. 12, 1968, Ser. No. 697,323
Int. Cl. G03c 1/28, 1/34
U.S. Cl. 96—107 9 Claims

A photographic element having incorporated in the light-sensitive silver halide emulsion layer or in a colloid layer contiguous therewith a phosphoric acid ester of a condensation product of an alkylene oxide with a butynediol.

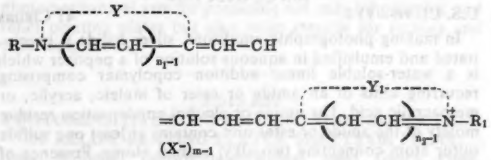
3,615,613

SPECTRALLY SENSITIZED PHOTOGRAPHIC SILVER HALIDE EMULSION

Keisuke Shiba; Masanao Hinata; Hiroshi Misu, and Akira Sato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

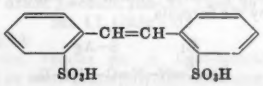
Filed Feb. 19, 1968, Ser. No. 707,025
Claims priority, application Japan, Feb. 18, 1968, 42/10285
Int. Cl. G03c 1/28
U.S. Cl. 96—126 6 Claims

A photographic silver halide emulsion containing a sensitizing dye represented by the general formula (I)

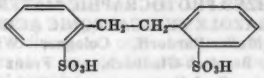


wherein Y and Y_1 each represents a member selected from the group consisting of a benzothiazole, benzoselenazole, and a quinoline; R and R_1 represents a member selected from the group consisting of an alkyl group, a substituted alkyl group, an aryl group, an allyl group, an aralkyl group, and a substituted aralkyl group; X^1 represents an anion; n_1 and n_2 each represents 1 or 2; and m represents 1 or 2, and a compound represented by the general formula (II)

wherein R_2, R_3, R_4 and R_5 each represents a member selected from the group consisting of a halogen atom, a hydroxyl group, an aryloxy group, an arylthio group, and arylamino group and A represents a member selected from the group consisting of



and



3,615,614

LIGHT-DEVELOPABLE DIRECT PRINT SILVER HALIDE EMULSION SENSITIZED WITH A COMBINATION OF COPPER, LEAD BROMIDE AND THIOUREA

Ivar T. Krohn; Geoffrey A. Page, and Thomas L. Mahalek, all of Rochester, N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Continuation-in-part of application Ser. No. 514,450, Dec. 17, 1965, now abandoned, Continuation-in-part of application Ser. No. 533,853, Mar. 14, 1966, now abandoned. This application Aug. 2, 1968, Ser. No. 749,684
Int. Cl. G03c 1/28
U.S. Cl. 96—108 11 Claims

A direct print light-developable photosensitive silver halide emulsion sensitized by copper, lead, bromide and thiourea. The sensitizer may be mixed with the silver halide layer forming a single-layer emulsion or may comprise a separate layer overcoating the silver halide layer forming a two-layer emulsion.

3,615,615

PHOTOGRAPHIC EMULSIONS INCLUDING REACTIVE QUATERNARY SALTS

Lewis L. Lincoln, and Donald W. Heseltine, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 828,064, Apr. 28, 1969. This application Apr. 13, 1970, Ser. No. 28,041
Int. Cl. G03c 1/34, 5/24, 1/28
U.S. Cl. 96—109 31 Claims

Reactive N-substituted, cyclammonium quaternary salts, wherein the N-substituent includes alkyl radicals whose terminal carbon atom is additionally substituted with a radical such as a formyl radical, an acetal or thioacetal radical including cyclic acetals and cyclic thioacetals, or a hydrazono radical which is itself optionally substituted, are useful photographic emulsion addenda such as antifoggants and nucleating agents in silver halide reversal emulsions, as well as being useful dye intermediates.

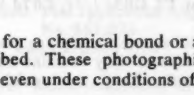
3,615,616

PHOTOGRAPHIC LIGHT-SENSITIVE SILVER HALIDE MATERIAL

Jozef Frans Willems, Wilrijk, and Frans Clement Heugebaert, Kontich, both of Belgium, assignors to Gevaert-AGFA N.V., Mortsel, Belgium

Filed Oct. 2, 1968, Ser. No. 764,621
Claims priority, application Great Britain, Oct. 9, 1967, 46105/67
Int. Cl. G03c 1/34
U.S. Cl. 96—109 9 Claims

Photographic materials comprising a light-sensitive silver halide emulsion layer having in the emulsion layer or in an adjacent water-permeable layer a bisterazole compound having the formula:



wherein A stands for a chemical bond or a bivalent organic radical are described. These photographic materials have decreased fogging even under conditions of high temperature and humidity.

3,615,617

STABILIZED PHOTOGRAPHIC MATERIAL WITH TETRAZOLE THIOCARBONIC ACID ESTER

Wolfgang Muller-Bardorff, Cologne; Wilhelm Saleck, Schildgen, Bergisch-Gladbach, and Franz Moll, Cologne, Stammheim, all of Germany, assignors to AGFA-Gevaert, Leverkusen, Germany

Filed Dec. 3, 1968, Ser. No. 780,885
Claims priority, application Germany, Dec. 12, 1968, P 15 97 503.8
Int. Cl. G03c *1/34*
U.S. Cl. 96—109 5 Claims

This invention relates to a photographic silver halide emulsion the stability of which is improved by addition of substituted 5-mercapto-tetrazole derivatives.

3,615,618

PHOTOGRAPHIC SILVER HALIDE COMPOSITIONS COMPRISING THIOURAZOLE ADDUCTS

Albert W. Wise; John W. Gates, Jr., and Dorothy J. Beavers, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 4, 1969, Ser. No. 816,867
Int. Cl. G03c *1/28, 1/34, 5/30*
U.S. Cl. 96—109 19 Claims

This invention relates to photographic compositions comprising adducts of thiourazoles, including dithiourazoles, with $\alpha\beta$-unsaturated compounds. Typical useful adducts are made with $\alpha\beta$-unsaturated acids, aldehydes, amides, ketones and esters and include monoadducts and diadducts of the thiourazoles.

3,615,619

PHENANTHROLINE ANTIFOGGANTS FOR SILVER HALIDE EMULSIONS

Toshihiko Yamamoto, Tokyo; Kazuo Matui, Tokyo, and Sadao Sugita, Hanno, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Mar. 30, 1970, Ser. No. 23,998
Claims priority, application Japan, Mar. 25, 1969, 44/22051
Int. Cl. G03c *1/34*
U.S. Cl. 96—109 4 Claims

A photographic material comprising phenanthroline antifogging agents for silver halide emulsions.

3,615,620

LIGHT-SENSITIVE MATERIAL

Jozef Frans Willems, Wilrijk; Robrecht Julius Thiers, Brasschaat, and Bernard Hippoliet Tavernier, Edegem, all of Belgium, assignors to Gevaert-AGFA, N.V., Mortsel, Belgium

Filed Dec. 7, 1967, Ser. No. 688,705
Claims priority, application Great Britain, Mar. 6, 1967, 10,371/67
Int. Cl. G03c *1/34*
U.S. Cl. 96—110 9 Claims

A light-sensitive material comprising a silver halide emulsion layer containing a mercury (II) oxide is described. The mercury (II) oxide stabilizes the emulsion against any increase in fog without substantial desensitization of the emulsion.

3,615,621

4-PYRIMIDINETHIONE COMPOUNDS AS FOG INHIBITORS

Robert W. Lamon, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 12, 1968, Ser. No. 751,745
Int. Cl. G03c *1/34*; C07d *5/18*
U.S. Cl. 96—109 19 Claims

4-Pyrimidinethione compounds are prepared by reaction of acyl isothiocyanate-tertiary enamine adducts with primary amines or ammonia. They are useful photographic fog inhibitors.

3,615,622

HARDENING GELATIN WITH POLYMERIC-BISULFITE ADDITION PRODUCT

Fumihiko Nishio, and Nobuo Yamamoto, both of Ashigara-Kamigun, Kanagawa, Japan, assignors to Fuji Shashin Film Kabushiki Kaisha, Kanagawa, Japan

Filed Aug. 16, 1966, Ser. No. 572,696
Claims priority, application Japan, Aug. 16, 1965, 40/49824
Int. Cl. G03c *1/30*
U.S. Cl. 96—111 8 Claims

A process for hardening gelatin by treating gelatin with a homopolymer of bisulfite addition product of vinyl isocyanate, a copolymer of bisulfite addition product of vinyl isocyanate and vinyl compound, a homopolymer of bisulfite addition product of isopropenyl isocyanate or a copolymer of bisulfite addition product of isopropenyl isocyanate and vinyl compound.

3,615,623

HARDENED GELATIN COMPOSITIONS AND A METHOD OF HARDENING SAME

Nathan D. Field, Allentown; David I. Randall, Easton, Pa., and Jimmie D. Fitzpatrick, Lafayette, La., assignors to GAF Corporation, New York, N.Y.

Filed Feb. 13, 1969, Ser. No. 799,089
Int. Cl. G03c *1/30*; C08h *1/06*
U.S. Cl. 96—111 5 Claims

A hardened gelatin composition and a method of hardening said gelatin composition wherein the gelatin is hardened by the addition of a pyrrolidonyl polyacrolein-bisulfite addition compound.

3,615,624

PEPTIZERS FOR SILVER HALIDE EMULSIONS USEFUL IN PHOTOGRAPHY

Donald A. Smith; Ernest J. Perry, and Kenneth R. Hollister, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 29, 1968, Ser. No. 701,084
Int. Cl. G03c *1/04*
U.S. Cl. 96—114 41 Claims

In making photographic emulsions, silver halide is precipitated and emulsified in aqueous solution of a peptizer which is a water-soluble linear addition copolymer comprising recurring units of an amide or ester of maleic, acrylic, or methacrylic acid. The amine or alcohol condensation residue moiety of the amide or ester unit contains at least one sulfide sulfur atom connecting two alkyl carbon atoms. Presence of this sulfide sulfur atom is critical to efficient peptizing action. emulsions made with these peptizers have various uses. Specific examples describe emulsions specially suited for physical development processes, very fine grain emulsions, negative speed emulsions, etc.

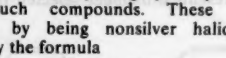
3,615,625

LIGHT-SENSITIVE SILVER SALTS OF THIOSEMICARBAZONES AND THIOCARBOHYDRAZONES

Grant M. Haist, and Wilbert J. Humphlett, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 26, 1968, Ser. No. 755,384
Int. Cl. G03c *1/02, 1/72*
U.S. Cl. 96—114.6 8 Claims

This invention comprises a novel class of light-sensitive silver compounds, and photographic systems and methods employing such compounds. These compounds are characterized by being nonsilver halides and can be represented by the formula



3,615,626

NEW PHOTOGRAPHIC EMULSION WITH A HIGH DEGREE OF COVERING POWER

Claude Guy Doste; Jean Clement Collange, and Guy Henri Leverrier, all of Vincennes, France, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 19, 1967, Ser. No. 668,940
Claims priority, application France, Sept. 20, 1966, 76,942
Int. Cl. G03c *1/02*
U.S. Cl. 96—114.8 20 Claims

Photographic silver halide gelatin emulsions are improved in covering power by pretreatment of a portion of the gelatin colloid binder with an enzyme that hydrolyzes the gelatin. Further improvement is obtained by treating the same portion with organic diacid anhydride, either before or after enzymatic action. Examples describe treatments with trypsin and phthalic anhydride.

3,615,627

PHOTOPOLYMERIZABLE COMPOSITIONS AND PROCESS OF MAKING SAME

John B. Rust, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Jan. 22, 1968, Ser. No. 699,368
Int. Cl. G03c *1/68*
U.S. Cl. 96—115 9 Claims

The embodiment of this disclosure provides for the method of preparing improved photopolymerizable noncrystalizing resinous film material and particularly of polyvalent metal salts of acrylic and methacrylic acids, and the products thereof.

3,615,628

PHOTOGRAPHIC ELEMENT AND COMPOSITION

John W. Mench; Brazelton Fulkerson, and William J. Dulmage, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 27, 1967, Ser. No. 693,710
Int. Cl. G03c *1/68*
U.S. Cl. 96—115 7 Claims

Sensitized polyesters containing unsaturated alicyclic rings are coated upon a support material to provide negative-working photographic elements useful in the photomechanical arts for preparing not only lithographic and relief printing plates but also resist stencils for etching and other operations.

3,615,629

PHOTOSENSITIVE COMPOSITIONS FOR PRODUCTION OF RELIEF-BEARING PLATES, SHEETS OR FILMS

Hans Wilhelm, Ludwigshafen/Rhine; Josef Georg Floss, Ludwigshafen/Rhine, and Herbert Henkler, Darmstadt, all of Germany, assignors to Badisch Anilin-& Soda-Fabrik Aktiengesellschaft, Ludwigshafen/Rhine, Germany

Filed Mar. 7, 1968, Ser. No. 711,185
Claims priority, application Germany, Mar. 10, 1967, P 15 22 444.9
Int. Cl. G03c *1/70*
U.S. Cl. 96—115 R 8 Claims

Crosslinkable photosensitive sheets, plates or film of soluble highly polymerized substances, compounds having at least two photopolymerizable double bonds, a photoinitiator and N-nitrosohydroxylamine derivatives as polymerization inhibitors.

3,615,630

LIGHT-SENSITIVE COATING AND RECORDING MATERIAL CONTAINING PHOTOPOLYMERIZABLE COMPOUNDS

Roland Dietrich, Wiesbaden-Biebrich, Germany, assignor to Kalle Aktiengesellschaft, Wiesbaden-Biebrich, Germany

Filed Nov. 6, 1968, Ser. No. 773,971
Claims priority, application Germany, Nov. 9, 1967, P 15 97 626.8; Swedish, June 28, 1968, 8877/68
Int. Cl. G03c *1/68*
U.S. Cl. 96—115 P 18 Claims

This invention relates to a light-sensitive mixture comprising one or more photopolymerizable compounds and, if desired, a binder, conventional sensitizers, dyestuffs and polymerization inhibitors, and to a recording material prepared by coating a support with the mixture, the mixture including, in addition to other ethylenically unsatured photopolymerizable compounds which may be present, at least one ethinyl quinole.

3,615,631

PHOTOGRAPHIC SILVER HALIDE EMULSION WITH INCREASED SENSITIVITY

Harald Huckstadt, Cologne-Stammheim; Wolfgang Himmelmann, Cologne-Stammheim; Wilhelm Saleck, Schildgen, Bergisch-Gladbach; August Randolph, Leverkusen; Erwin Ranz, Leverkusen; Walter Simmler, Odenthal, and Hans-Dietrich Golitz, Cologne-Stammheim, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 18, 1968, Ser. No. 784,909
Claims priority, application Germany, Dec. 22, 1967, P 15 97 511.8
Int. Cl. G03c *1/10*
U.S. Cl. 96—120 7 Claims

A photographic silver halide emulsion chemically sensitized by a cyclic amino compound containing at least one dialkylsilyl group added to the silver halide emulsion.

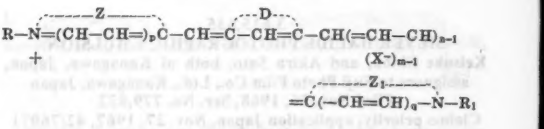
3,615,632

SUPERSENSITIZED PHOTOGRAPHIC SILVER HALIDE LIGHT-SENSITIVE ELEMENTS

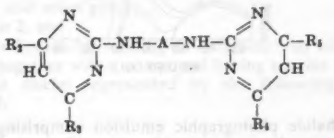
Keisuke Shiba; Masanao Hinata; Akira Sato, and Hiroshi Misu, all of Kanagawa, Japan, assignors to Fuji Photo Films Co., Ltd., Kanagawa, Japan

Filed July 26, 1968, Ser. No. 747,815
Claims priority, application Japan, July 29, 1967, 42/48761
Int. Cl. G03c *1/28*
U.S. Cl. 96—122 6 Claims

A photographic silver halide light-sensitive element containing a support bearing thereon, a silver halide emulsion containing at least one sensitizing dye having the structure,



and at least one compound of the structure



3,615,633

SILVER HALIDE PHOTOGRAPHIC EMULSIONS SUPERSENSITIZED WITH AN OXADIAZOLE AND A METHINE DYE

Dugald A. Brooks, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 757,148, Sept. 3, 1968, now abandoned. This application Aug. 18, 1969, Ser. No. 851,074
Int. Cl. G03c *1/28*
U.S. Cl. 96—123 9 Claims

Photographic silver halide emulsions are supersensitized with the combination of a photographic spectral sensitizing

methine dye and an oxazole, an oxadiazole, a thiozole or a thiadiazole.

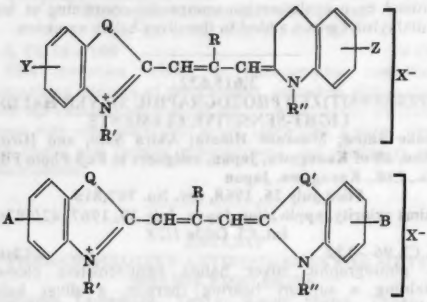
3,615,634

OPTICALLY SENSITIZED LIGHT-SENSITIVE SILVER HALIDE MATERIAL

Johannes Gotze, Bergisch-Neukirchen; Oskar Riester, Leverkusen, Germany; Herman Adelbert Philippaerts, Mortsel; Theofiel Hubert Ghys, Kontich, Belgium; Marie Hase, Schildgenbergisch-Gladbach, and Karl Kuffner, Unterhaching b. near Muenchen, Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 2, 1968, Ser. No. 718,127
Claims priority, application Germany, Apr. 10, 1967, A 55 409; Aug. 24, 1967, A 56 590
Int. Cl. G03c 1/28
U.S. Cl. 96—124 8 Claims

Silver halide emulsions are very effectively sensitized to red with combination of two dyes

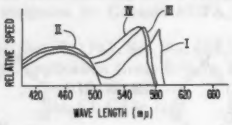


3,615,635

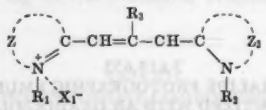
SILVER HALIDE PHOTOGRAPHIC EMULSION

Keisuke Shiba, and Akira Sato, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 26, 1968, Ser. No. 779,022
Claims priority, application Japan, Nov. 27, 1967, 42/76071
Int. Cl. G03c 1/28
U.S. Cl. 96—126 4 Claims

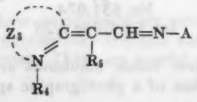


Silver halide photographic emulsion comprising at least one sensitizing dye represented by general formula I:

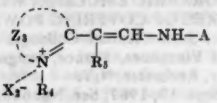


and at least one organic heterocyclic compound selected from the formulas represented by the general formulas II and III, wherein

general Formula II is:



and general Formula III is:



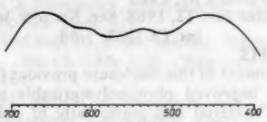
The substituent moieties shown in the above groups are described in the specification.

3,615,636

SPECTRALLY SENSITIZED DIRECT POSITIVE EMULSION

Oskar Riester, Leverkusen, Germany, assignor to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 3, 1968, Ser. No. 780,651
Claims priority, application Germany, Dec. 12, 1967, P 15 97 502.7
Int. Cl. G03c 1/10, 1/28
U.S. Cl. 96—126 6 Claims



The invention relates to photographic direct positive emulsions which are spectrally sensitized by a combination of triphenyl methane dyes and indocyanine dyes.

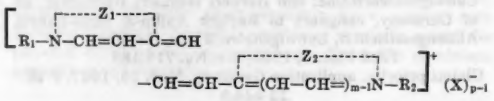
3,615,637

SPECTRALLY SENSITIZED PHOTOGRAPHIC SILVER HALIDE EMULSIONS

Keisuke Shiba; Masanao Hinata; Nobuo Tsuji, and Masao Sawahara, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 4, 1969, Ser. No. 882,271
Claims priority, application Japan, Dec. 4, 1968, 43/88768
Int. Cl. G03c 1/28
U.S. Cl. 96—126 7 Claims

A supersensitized photographic silver halide emulsion containing a sensitizing dye represented by the following general formula:



and a condensate of formaldehyde and a polyhydroxybenzene, which may be substituted or unsubstituted. The emulsion is supersensitized. The sensitizing dye must contain at least one quinoline nucleus.

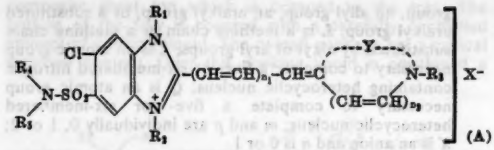
3,615,638

SENSITIZED PHOTOGRAPHIC SILVER HALIDE EMULSIONS

Shiro Kimura; Yoshiyuki Nakazawa; Akira Sato, and Yasuharu Nakamura, all of Kanagawa, Japan, assignors to Fuji Shashin Film Kabushiki Kaisha, Kanagawa, Japan

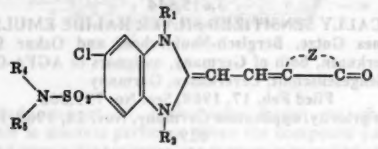
Filed Sept. 28, 1967, Ser. No. 671,232
Claims priority, application Japan, Sept. 28, 1966, 41/63936
Int. Cl. G03c 1/10
U.S. Cl. 96—128 4 Claims

A silver halide photographic emulsion containing at least one of the following: 1. a cyanine sensitizing dye represented by the general formula (A)



(A)

and (2) a merocyanine dye represented by the general Formula (B)



(B)

The dyes have at least one benzimidazole nucleus in which one hydrogen atom of the benzene ring forming the nucleus is substituted by a chlorine atom, and another hydrogen atom of the ring is substituted by a sulfonyl derivative group as shown in the general formulas.

3,615,639

DIRECT POSITIVE SILVER HALIDE EMULSIONS CONTAINING DYES AS ELECTRON ACCEPTORS AND SPECTRAL SENSITIZERS

James W. Carpenter; John D. Mee, and Donald W. Heseltine, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 23, 1967, Ser. No. 677,058
Int. Cl. G03c 1/10
U.S. Cl. 96—130 29 Claims

Novel polymethine dyes are provided which feature an imidazole ring joined at the carbon atom in the 5-position of the imidazole ring to a dimethine linkage, the imidazole ring having fused to the [a] side thereof the nonmetallic atoms required to complete at least one fused ring, and a second desensitizing nucleus joined at a carbon thereof to the dimethine linkage. The invention also provides novel photographic silver halide emulsions, including direct positive emulsions containing the dyes of the invention.

3,615,640

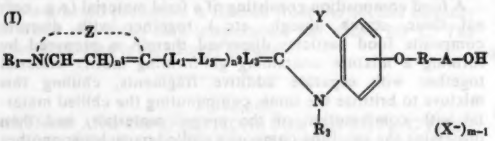
PHOTOGRAPHIC SILVER HALIDE EMULSIONS CONTAINING BENZOTHIAZOLE CYANINE SENSITIZERS

Yoshiyuki Nakazawa; Masao Sawahara; Akira Sato, and Masanao Hinata, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd, Kanagawa, Japan

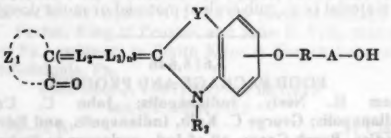
Filed May 27, 1968, Ser. No. 732,062
Claims priority, application Japan, May 26, 1967, 42/33473
Int. Cl. G03c 1/08, 1/10
U.S. Cl. 96—133 3 Claims

A photographic silver halide emulsion containing at least one sensitizing dye represented by the formula I or II;

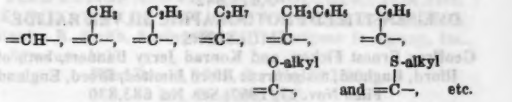
(I)



(II)



wherein R represents a divalent hydrocarbon group having one-four carbon atoms, R_1 and R_2 each represents an alkyl group having one to four carbon atoms, a substituted alkyl group such as 2-hydroxyethyl group, a 2-acetoxyethyl group, a 3-hydroxypropyl group, a carboxymethyl group, a 2-carboxyethyl group, a 3-carboxypropyl group, a 2-sulfoethyl group, a 3-sulfopropyl group, a 4-sulfobutyl group, an allyl group (i.e., a vinyl methyl group), a benzyl group (i.e., a phenyl methyl group), a phenylethyl group, or a phenoxyethyl group, A represents SO_2 or CO, L_1 and L_2 and L_3 represent methine groups such as



n_1 represents 0 or 1, n_2 represents 0, 1 or 2, n_3 represents 1 or 2. m represents 1 when the intramolecular salt is formed, or 2 when the intramolecular salt is not formed, X^1 represents an anion such as chloride ion, bromide ion, iodide ion, perchlorate ion, p-toluene-sulfonate ion, benzene sulfonate ion, ethyl sulfate ion, Y represents S or Se, Z represents nonmetallic atoms necessary to complete a heterocyclic ring used in cynanine dyes such as thiazoles, thiadiazoles, benzothiazoles, naphthothiazoles, oxazoles, benzoxazoles, naphthoxazoles, selenazoles, benzoselenazoles, naphthoselenazoles, thiazolines, oxazolines, selenazolines, indolenines pyridines 2-quionolines, 4-quinolines, benzimidazoles, Z_1 represents nonmetallic atoms necessary to complete a heterocyclic ring usually used in merocyanine dyes, selected from rhodanines pyrazolones, 2-thiohindantoines, isoxazolones, oxyindoles, 2-thiobarbaolic acids, 2-thio-2,4-oxazolidinediones.

3,615,641

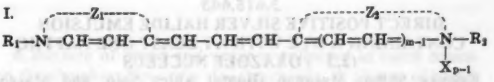
PHOTOGRAPHIC SILVER HALIDE EMULSION

Keisuke Shiba; Masanao Hinata; Reiichi Ohi, and Hiroshi Misu, all of Kanagawa, Japan, assignors to Fuji Photo-Film Co., Ltd., Kanagawa, Japan

Filed Nov. 2, 1967, Ser. No. 680,024
Claims priority, application Japan, Nov. 2, 1966, 41/72263
Int. Cl. G03c 1/10
U.S. Cl. 96—130 9 Claims

A photographic silver halide emulsion having incorporated therein the sensitizing dye represented by the following general formula I:

I.



wherein Z_1 represents the nonmetallic atoms necessary for forming 4-quinoline nucleus,

Z_2 represents the nonmetallic atoms necessary for forming a 5- or 6-membered ring,

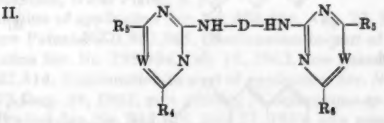
R_1 and R_2 represent substituted or nonsubstituted alkyl groups,

X is an acid anion group,

m is 1 or 2, and

p is 1 or 2, said dye forming an intramolecular salt when p is 1, and together with a compound having triazine nuclei or pyrimidine nuclei represented by the following general formula II:

II.



wherein D represents a divalent aromatic group combining with each other the pyromidinylamino groups or triazinylamino groups shown in the above formula,

R_3, R_4, R_5 and R_6 each represents a hydrogen atom, a hydroxyl group, an alkoxyl group, a halogen atom, an amino group, an alkyl amino group or a substituted alkylamino group, such as, a hydroxyalkylamino group, a sulfoalkylamino group, a cycloalkylamino group, an

arylamino group and a heterocyclic amino residual group, and

W represents CH– or N–.

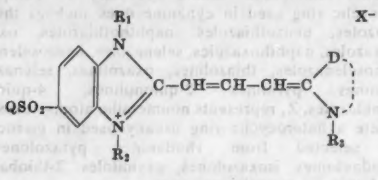
3,615,642

DYE-SENSITIZED PHOTOGRAPHIC SILVER HALIDE EMULSIONS

Geoffrey Ernest Ficken, and Konrad Jerzy Bannert, both of Ilford, England, assignors to Ilford Limited, Ilford, England

Filed Nov. 17, 1967, Ser. No. 683,830
Claims priority, application Great Britain, Nov. 28, 1966, 53172/66; Dec. 19, 1966, 56607/66
Int. Cl. G03c *1/18*
U.S. Cl. 96—130 **2 Claims**

This application describes a trimethincyanine dye of the general formula:



wherein either one of R_1 and R_2 is an alkyl group and R_3 and the other of R_1 and R_2 is an alkyl, aryl, sulphoalkyl, hydroxyalkyl, alkoxyalkyl, carboxyalkyl, aralkyl or carboxybenzyl group, or an acylsulphamoyl alkyl group of the formula $-(CH_2)_nSO_2NHCOR_{20}$ where n is an integer from one to six and R_{20} is an alkyl group, or an alkyl or aralkyl sulphamoyalkyl group of the formula $-(CH_2)_nSO_2NHR_1$ where n is an integer from one t0 six and R_{21} is an alkyl or aralkyl group, Q is phenyl or phenyl substituted with at least one halogen, alkyl or alkoxy substituent, and D represents the atoms necessary to complete a benzimidazole, benzoxazole, benzothiazole, benzoselenazole or 3H-indole ring, the benzene nucleus in all cases being optionally substituted, and X is an anion.

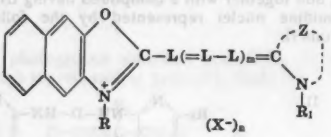
3,615,643

DIRECT POSITIVE SILVER HALIDE EMULSION CONTAINING A DYE WITH AT LEAST ONE NAPTHO (2,3) OXAZOLE NUCLEUS

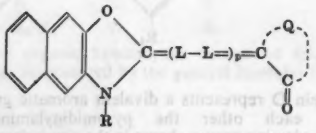
Keisuke Shiba; Masanao Hinata; Akira Sato, and Masao Sawahara, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 8, 1970, Ser. No. 1,488
Claims priority, application Japan, Jan. 8, 1969, 44/1555
Int. Cl. G03c *1/08, 1/10*
U.S. Cl. 96—137 **5 Claims**

A fogged direct positive silver halide photographic emulsion containing a dye selected from the group represented by the following formulae:



and



wherein R and R_1, which may be the same or different, each represents an alkyl group, an alkoxyalkyl group, a hydroxyalkyl group, a carboxyalkyl group, a sulphoalkyl group, an allyl group, an aralkyl group, or a substituted aralkyl group, L is a methine chain or a methine chain substituted by alkyl or aryl groups; Z is an atomic group necessary to complete a five- or six-membered nitrogen containing heterocyclic nucleus; Q is an atomic group necessary to complete a five- or six-membered heterocyclic nucleus; m and p are individually 0, 1 or 2; X is an anion and n is 0 or 1.

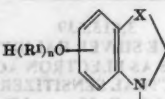
3,615,644

OPTICALLY SENSITIZED SILVER HALIDE EMULSIONS

Johannes Gotze, Bergisch-Neukirchen, and Oskar Riester, Leverkusen, both of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 17, 1969, Ser. No. 799,566
Claims priority, application Germany, Nov. 24, 1968, P 16 70 029.1
Int. Cl. G03c *1/10, 1/08*
U.S. Cl. 96—138 **4 Claims**

In a photographic silver halide emulsion spectrally sensitizing the emulsion with a sensitizer of the general formula



in which:

X is a sulfur, selenium or oxygen atom, or a group –CH=CH–;

n is 1–5;

R′ is an ethyleneoxy or a 1,2-propyleneoxy unit;

R″ is a saturated or unsaturated aliphatic group having up to five carbon atoms, suitably substituted;

R‴ is a monomethine group substituted with a five- or six-membered heterocyclic ring containing nitrogen as ring member; or a trimethine, pentamethine or heptamethine chain carrying in the terminal position an oxazole, benzoxazole, naphthoxazole, thiazoline, thiazole, benzothiazole, naphthothiazole, selenazole, benzoselenazole, naphthoselenazole, thiadiazole, imidazole, benzimidazole or 2- or 4-quinoline ring, or a dimethine or tetramethine which carries in the terminal position a rhodanine, thiohydantoin, thiobarbituric acid or pyrazolone radical, or a rhodanine, thiohydantoin, thiobarbituric acid or pyrazolone radical.

3,615,645

METHOD OF MAKING FOOD PRODUCT CONTAINING GEL PARTICLES

John H. Forkner, 6037 North Van Ness Blvd., Fresno, Calif.

Filed July 31, 1968, Ser. No. 749,035
Int. Cl. A23l *1/06, 1/10, 1/00*
U.S. Cl. 99—1 **3 Claims**

A food composition consisting of a food material (e.g., cereal flour, starch, dough, etc.,) together with discrete composite food particles dispersed therein is prepared by forming a mixture containing gel-forming matrix material together with separate additive fragments, chilling this mixture to brittlize the same, comminuting the chilled material with comminution of the nongel materials, and then dispersing the resulting composite chilled particles in another food material (e.g., pulverulent material or moist dough).

3,615,646

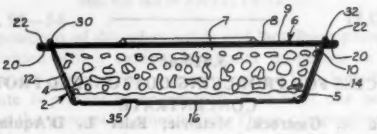
FOOD PACKAGE AND PROCESS

William H. Neely, Indianapolis; John C. Calhoun, Indianapolis; George C. Kolb, Indianapolis, and Edward S. Lindley, Beech Grove, all of Ind., assignors to Stokely Van Camp, Inc., Indianapolis, Ind.

Filed Feb. 17, 1969, Ser. No. 799,586
Int. Cl. B65d *81/34*
U.S. Cl. 99—1 **11 Claims**

This invention is concerned with a frozen food package which generally comprises a sheet metal tray and a paper

composite sheet top which is crimped to the tray. The bottom of the tray is covered with a carefully controlled amount of cooking liquid. The overall package has a critical moisture content. Over this cooking liquid is positioned a



controlled amount of individually frozen or chopped vegetable in discrete particles. When the composite package is placed over a heat source, the contents are quickly heated to a palatable temperature without burning or charring.

3,615,647

EXPANDED FAT-COATED ANIMAL FOOD HAVING A COHERENT COATING

Clyde P. Kassens, Liberty, Ind., assignor to Perk Foods Co.

Filed Mar. 27, 1968, Ser. No. 716,309
Int. Cl. A23k *1/10*
U.S. Cl. 99—2 R 9 Claims

A porous, expanded animal food is provided comprising chunks having starch-containing and protein-containing constituents. The chunks are covered with a coating of fat, which coating is overlaid with a coherent coating containing dextrinized starch to prevent the migration of volatile ingredients and nutrients away from the food product and to provide a hard, nongreasy coating which also prevents fat loss or leakage from the surface of the chunks and protects the fat against oxidative rancidity. The coherent coating is applied by wetting the surface of the chunks with an aqueous solution of the dextrinized starch and thereafter drying off the aqueous solvent.

3,615,648

PROCESS FOR THE EXTRACTION OF TOXIC SUBSTANCES FROM A PRESSCAKE OF BRASSICA NAPUS

Fernando Monckeberg Barros, Santiago, Chile, assignor to University of Chile as represented by Ruy Barbosa Popolizio, Rector, Santiago, Chile

Filed Oct. 29, 1968, Ser. No. 771,647
Int. Cl. A23l *1/20*; A23k *1/00*
U.S. Cl. 99—2 R 1 Claim

A process for improving the biological value of proteins in Brassica Napus is shown. A presscake remaining after the plant is pressed and extracted to remove oils is subjected to the following steps. The presscake is first macerated in a quantity of water at room temperature for a period of 15 hours, the ratio of presscake to water being 1:5 by weight. The macerated presscake is then filtered from the water and agitated in a second quantity of water for a period of 3 hours. The extracted presscake is filtered from the second quantity of water and dried at a temperature not above 60° C. The dried presscake is then finely ground.

3,615,649

METHOD AND COMPOSITIONS FOR IMPROVING FEED EFFICIENCY OF RUMINANTS USING POLYHALO-HEMIACETAL DERIVATIVES OF SACCHARIDES

Roger C. Parish, King of Prussia, and John E. Trei, Malvern, both of Pa., assignors to Smith Kline & French Laboratories, Philadelphia, Pa.

Filed Dec. 3, 1969, Ser. No. 881,915
Int. Cl. A23k *1/16*
U.S. Cl. 99—2 R 21 Claims

Polyhalohemiacetal derivatives of saccharides and especially polysaccharides improve the feed efficiency of commercial ruminant animals by inhibiting methanogenesis in the rumen. The derivatives are inexpensive to prepare and have no unpleasant taste, odor or stability problems. A preferred compound is the chloral-starch condensation product which may be added to whole feed, used as a premix or in salt blocks.

3,615,650

FEED RATION AND FEEDING PROCEDURE FOR THE ELIMINATION OF PESTICIDE RESIDUES IN POULTRY

Stanley B. Smith, Springville, N.Y., assignor to Agway, Inc., Syracuse, N.Y.

Filed Dec. 4, 1969, Ser. No. 882,306
Int. Cl. A23k *1/00*
U.S. Cl. 99—4 1 Claim

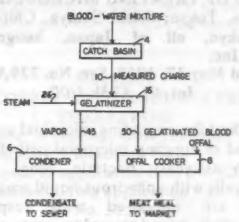
This invention concerns an improved feed ration and feeding procedure for the removal of chlorinated hydrocarbon pesticide residues, and other fat-soluble pesticide residues, from poultry meat and eggs, where the fowls have been exposed to, or have ingested, chlorinated hydrocarbon or other fat-soluble pesticide residues.

3,615,651

GELATINIZING BLOOD FOR FEED

George W. Parks, Jr., 314 6th St., Snyder, Tex.

Filed Feb. 4, 1969, Ser. No. 796,450
Int. Cl. A23k *1/04*; A23j *1/06*
U.S. Cl. 99—7 11 Claims



A mixture of blood and water is collected in catch basins on the slaughter floor of a slaughterhouse. A charge of blood and water is transferred from the catch basin to a closed container or gelatinizer where about 50 or 60 percent of the water content is vaporized through the injection of live steam into the gelatinizer and also by adding heat through steam coils in the gelatinizer. The live steam also agitates the charge. Thereafter the gelatinizer is closed and the gelatinated blood thus formed is removed by increasing the pressure in the vessel, forcing the gelatinated blood out a drain.

3,615,652

METHOD OF MAKING ANIMAL FOOD

Hovey M. Burgess, Greenwich, and Robert W. Mellentin, Westport, both of Conn., assignors to General Foods Corporation, White Plains, N.Y.

Continuation of application Ser. No. 486,586, Aug. 23, 1965, now Patent No. 3,982,985, Continuation-in-part of application Ser. No. 295,604, July 15, 1963, now Patent No. 3,202,514, Continuation-in-part of application Ser. No. 216,723, Aug. 14, 1962, now pending, Continuation-in-part of application Ser. No. 829,510, July 27, 1959, now pending.
This application Dec. 5, 1969, Ser. No. 882,694
Int. Cl. A23k *1/00*, *1/10*
U.S. Cl. 99—7 2 Claims

Nutritionally balanced animal food is pasteurized into a stable intermediate moisture product by employing an antimycotic and sugar in amounts sufficient to increase osmotic pressure and thereby stabilize the pasteurized matrix, the matrix being thereafter cooled and shaped into the desired form.

3,615,653

TREATING GRAINS AND THE LIKE WITH ACIDIC SOLUTION OF LIGNOSULFONATE

Elmer H. Fults, 219 Woodward Ave., and George E. Sanko, 3734 W. Feemster Ave., both of Visalia, Calif.

Continuation-in-part of application Ser. No. 588,329, Oct. 21, 1966, now abandoned. This application Sept. 24, 1969, Ser. No. 860,799

Int. Cl. A23k *1/00, 3/00;* A23l *1/10*

U.S. Cl. 99—8 21 Claims

A method of treating grains, seeds, and the like to improve the chemical and physical characteristics thereof by applying thereto acidic aqueous solutions containing lignosulfonate and a wetting agent for breaking down the relatively hard waxy coating from the grains which provides accelerated penetration of the solution into the endosperm thereof for improved starch gelatinization and nutrient utilization which permits feeding of such treated grains to animals without further chemical or mechanical processing. The method of the present invention is further employed as a pretreatment for whole grains which are further processed for consumption by either humans or animals whereby the above treated grains are rendered more ductile and malleable to facilitate such subsequent mechanical processes including rolling, cracking, grinding, popping and the like.

3,615,654

METHOD OF TREATING MICROBIAL CELLS

Yaichi Ayukawa, Tokyo; Seishi Shinya, Chiba, and Masaki Tamura, Tokyo, all of Japan, assignors to CPC International Inc.

Filed May 17, 1968, Ser. No. 729,922

Int. Cl. A23k *1/00*

U.S. Cl. 99—9 23 Claims

Covers a method for upgrading microbial cells. Particularly covers a method of treating microbial cells found in microorganisms such as yeast, bacteria, fungi, algae, etc. by contacting the cells with anhydrous liquid ammonia. The thus treated cells are improved with respect to such characteristics such as odor, color, taste, etc. and have increased protein content. Microbial cells such as yeast which have a substantial ribonucleic acid content when thus treated are found to have a decreased ribonucleic acid content.

3,615,655

METHOD FOR PREPARING HIGH PROTEIN CEREAL GRAIN PRODUCT

Jere E. Freeman, Hinsdale, and Richard M. Olson, North Riverside, both of Ill., assignors to CPC International Inc., New York, N.Y.

Filed July 19, 1967, Ser. No. 654,360

Int. Cl. A23j *1/12;* A23l *1/10*

U.S. Cl. 99—17 9 Claims

A protein rich product which is particularly useful for human consumption is prepared from a cereal grain by rupturing the cells of the cereal grain germ, abrading the ruptured germ to free adherent protein particles from the remainder of the germ cell fragments, and separating out a protein rich fraction low in fiber content from a protein lean germ residue fraction, relatively high in fibrous type materials.

3,615,656

PROCESS FOR THE PRODUCTION OF FLAVORED PROTEIN FOODS

Don Edward Alden, Park Forest, Ill., assignor to Swift & Company, Chicago, Ill.

Filed Mar. 8, 1968, Ser. No. 711,538

Int. Cl. A23j *1/26*

U.S. Cl. 99—17 4 Claims

Simulated and artificially flavored proteinaceous food products are prepared using an expanded protein material, by a critical sequence of steps wherein a solution of flavoring material is applied to the expanded material and thereby absorbed throughout the interstices thereof and a melted fat is also applied and dispersed throughout the protein structure whereafter the treated material is heated so as to combine the artificial flavoring and fat materials and to reduce the moisture content to a shelf stable level.

3,615,657

PROCESS FOR PRODUCING COTTONSEED PROTEIN CONCENTRATE

Edward A. Gastrock, Metairie; Esler L. D'Aquin, New Orleans, and Paul H. Eaves, Metairie, all of La.

Filed Sept. 13, 1968, Ser. No. 759,647

Int. Cl. A23j *1/14*

U.S. Cl. 99—17 4 Claims

A process for producing a high protein cottonseed concentrate from cottonseed meats which process is characterized by an integrated sequence of drying, flaking, disintegrating, screen separating and gravity separating steps. The process accomplishes the substantially complete removal of intact cottonseed pigment glands and as a consequence thereof, the isolation of gland-free material, which material can be exalted to exhibit a protein content as high as 73 percent by weight on an oil and moisture free basis.

3,615,658

PREPARATION OF BREAD-LIKE BAKERY PRODUCTS

Elmer F. Glabe, Chicago, Ill., assignor to Food Technology, Inc., Chicago, Ill.

Filed Jan. 29, 1969, Ser. No. 795,067

Int. Cl. A21d *13/04, 13/06*

U.S. Cl. 99—17 10 Claims

Honeycomblike bakery products, for example, crustless bread, are prepared by mixing a starch and oil seed protein and water to form a dough mixture, heating said dough mixture with live steam, with agitation, in a closed vessel until a baked honeycomblike product is formed, and recovering said product.

3,615,659

PREPARING A CHOCOLATE-FLAVORED BEVERAGE

Meyer Michael Weber, Milwaukee, Wis., assignor to Wisconsin Research Associates

Filed Aug. 28, 1968, Ser. No. 755,832

Int. Cl. A23g *1/00*

U.S. Cl. 99—26 10 Claims

A sediment-free chocolate-flavored beverage is prepared by mixing a fat-free cocoa extract with water or milk and heating to 110–130° C., cooling to 5–20° C. to form a precipitate, separating the precipitate, packaging the beverage and sterilizing the packaged beverage.

3,615,660

HOP EXTRACT EMULSION, AND PREPARATION AND USE THEREOF

Vincent S. Bavisotto, Mahtomedi, Minn., and Gavin L. Hansen, Grafton, Wis., assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of application Ser. No. 491,391, Sept. 29, 1971, now abandoned. This application June 11, 1969, Ser. No. 832,445

Int. Cl. C12c *9/02*

U.S. Cl. 99—50.5 7 Claims

Preisomerized and reduced hop extracts are stabilized by mixing with emulsifying agent, gum arabic, and preferably sorbitol in an aqueous medium. The products are cold water dispersible, and when added to the wort or beer after kettle boiling result in light-stable beer or ale.

3,615,661

REPLACEMENT OF SODIUM CASEINATE

Rudolph H. Ellinger, New Canaan, Conn., and Mark G. Schwartz, Yonkers, N.Y., assignors to Stauffer Chemical Company, New York, N.Y.

Filed July 15, 1968, Ser. No. 744,680
Int. Cl. A23c *13/12, 19/12*
U.S. Cl. 99—54 15 Claims

Compositions of dry whey solids and lactalbum phosphate are provided which exhibit functional properties in food compositions as well as nutrient value. The lactalbumin phosphate is present in an amount of at least one percent based on the percent of whey solids. These compositions are preferably used as replacement, total or partial for sodium caseinate in nonbutterfat dairy products.

3,615,662

REPLACEMENT OF SODIUM CASEINATE

Rudolph H. Ellinger, New Canaan, Conn., and Mark G. Schwartz, Yonkers, N.Y., assignors to Stauffer Chemical Company, New York, N.Y.

Filed July 15, 1968, Ser. No. 744,679
Int. Cl. A23c *13/12, 19/12*
U.S. Cl. 99—54 21 Claims

Compositions of demineralized dry whey solids and either monosodium phosphate or insoluble metaphosphate are provided which exhibit functional properties in food compositions as well as nutrient value. The phosphate is present in an amount of at least one percent based on protein. The demineralized dry whey solids contain no more than 5.0 percent by weight of whey minerals. These compositions are preferably used as replacement, total or partial, for sodium caseinate in nonbutterfat dairy products.

3,615,663

PRODUCTION OF NONHYGROSCOPIC ACID WHEY POWDER

James Joseph Becker, River Falls, Wis., assignor to The DeLaval Separator Company, Poughkeepsie, N.Y.

Filed Apr. 14, 1969, Ser. No. 815,622
Int. Cl. A23c *21/00*
U.S. Cl. 99—57 4 Claims

After pasteurizing the acid whey and condensing it in an evaporator, it is flash-cooled and passed to a cold-wall storage tank of the type having an agitator which sweeps the exposed surface of the cold wall. The whey is thus stored until small crystals of the lactose are formed and the whey acquires a smooth texture in which the lactose crystals are invisible to the naked eye, and thereafter the conditioned whey is spray dried to form a powder.

3,615,664

TREATMENT OF WHEY

Leo H. Francis, Burlingame, Calif., assignor to Foremost-McKesson, Inc., San Francisco, Calif.

Continuation-in-part of application Ser. No. 480,068, Aug. 16, 1965, now abandoned, Continuation-in-part of application Ser. No. 521,116, Jan. 17, 1966, now abandoned, Continuation-in-part of application Ser. No. 624,306, Mar. 20, 1968, now abandoned, Continuation of application Ser. No. 733,965, May 31, 1968, now abandoned. This application Dec. 5, 1969, Ser. No. 878,972
Int. Cl. A23c *21/00*
U.S. Cl. 99—57 3 Claims

Liquid whey is subjected to concentration, crystallization of lactose and removal of lactose crystals. The resulting whey is clarified and electrodialyzed. It can be sold or used in liquid form, or may be further concentrated and dried to make a demineralized dry product with a reduction in ash content of at least 15 percent.

3,615,665

CONFINED VOLUME COFFEE AROMA

William V. White, deceased, late of Spring Valley, N.Y. (by Grace H. White, heir and executrix); Claudia L. White and Roger E. White, heirs, Spring Valley, N.Y.; James P. Mahlmann, Wayne, and Robert P. Stolz, Dumont, N.J., assignors to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 571,382, Aug. 10, 1966, Pat. No. 3,476,566. Filed Aug. 12, 1969, Ser. No. 849,531
Int. Cl. A23f *1/04*
U.S. Cl. 99—65 11 Claims

A new method of stripping desirable volatiles from roasted coffee has been discovered which does not significantly degrade the quality of the roasted coffee. Roasted coffee is contacted with dry steam in a confined volume at above atmospheric pressures. The pressure is then relieved and the vapors which escape due to the reduction of pressure in the column are condensed to recover aromatic and flavor constituents.

3,615,666

HEAT TREATMENT OF STEAM DISTILLATE

Stephen L. Schlichter, Green Township, Hamilton County, and Frederick M. Joffe, Wyoming, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 31, 1969, Ser. No. 873,102
Int. Cl. A23f *1/04*
U.S. Cl. 99—65 6 Claims

Disclosed is a controlled heat treatment of steam distillate obtained from steam distillation of roast and ground coffee. The heat-treated distillate is added back to an instant coffee processing stream to provide a unique flavored product.

3,615,667

FLAKED COFFEE AND PRODUCTS PRODUCED THEREFROM

Frederick M. Joffe, Wyoming, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of application Ser. No. 823,954, May 12, 1969, now abandoned. This application Apr. 20, 1970, Ser. No. 30,246
Int. Cl. A23f *1/02, 1/06, 1/10*
U.S. Cl. 99—68 46 Claims

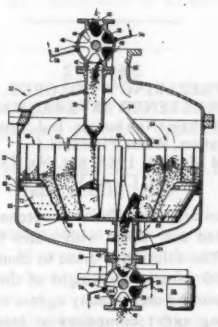
Flaking of roast and ground coffee can be used advantageously to control or regulate the flavor and aroma of coffee as well as the extractability. Utilizing the varying effect of flaking on high, low, and intermediate grade coffees, an improved roast coffee product comprising as a major portion low and/or intermediate grade flaked coffees, and as a minor portion high-grade roasted and ground coffee, is prepared. Also disclosed are flakes having particularly desirable physical properties.

3,615,668

METHOD FOR PROCESSING PARTICULATE SOLIDS

Horace L. Smith, Jr., Richmond, Va., assignors to Smitherm Industries, Inc., Richmond, Va.

Filed June 8, 1970, Ser. No. 44,464
Int. Cl. A23f *1/02*
U.S. Cl. 99—68 11 Claims



Method for processing particulate solids in a continuous operation, which includes a reactor, a system for heating and

circulating a fluid through the reactor, and arrangements for continuously supplying material to be processed to and discharging it from the reactor, the processing being accomplished by convective heating of the solids.

3,615,669

PROCESS FOR AGGLOMERATING INSTANT COFFEE

Eddy R. Hair, Colerain Township; Robert A. Cody, Forest Park, and Aubrey R. McLain, Wyoming, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed June 26, 1967, Ser. No. 649,020
Int. Cl. A23f *1/08*

U.S. Cl. 99—71 **9 Claims**

Instant coffee particles can be agglomerated efficiently by spraying onto a gently agitated bed of the particles a small amount of a highly concentrated solution of coffee solubles in water.

3,615,670

HEATED SURFACE AGGLOMERATION

Boleslaw Sienkiewicz, Pearl River, and William J. Meyer, Orangeburg, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Mar. 27, 1969, Ser. No. 811,209
Int. Cl. A23f *1/04*

U.S. Cl. 99—71 **7 Claims**

A process for agglomeration wherein particles to be agglomerated are wetted and spread onto a solid surface carrier. The carrier is passed over a heated zone in order to raise the temperature of the particles to their fusion point and dry the fused agglomerates. The particles are then carried over a second zone where the temperature of the particles is reduced rapidly to about room temperature. The agglomeration process of this invention eliminates the need for large drying towers and avoids the necessity of costly product pretreatment required in many conventional agglomeration processes.

3,615,671

DRY FOOD PRODUCTS IN SPUN FILAMENTS AND METHOD OF MAKING SAME

Myron D. Shoaf, Battle Creek; Charles W. Groesbeck, Marshall, Mich., and David G. Cowart, Chicago, Ill., assignors to General Foods Corporation, White Plains, N.Y.

Filed Apr. 19, 1968, Ser. No. 722,560
Int. Cl. A23l *1/00*

U.S. Cl. 99—78 **5 Claims**

A sugar mix containing at least 60 percent sucrose and a humectant is spun under controlled humidity. The spun sugar filaments are then compressed around dry, particulate food pieces such as a cereal or a beverage mix without affecting the solubility of the filaments. The products is packaged within a moistureproof package.

3,615,672

METHOD OF PREPARING A COLORED, ARTIFICIALLY SWEETENED BEVERAGE MIX

La Monte D. Pischke, Newburgh, Ind., assignor to General Foods Corporation, White Plains, N.J.

Filed May 31, 1968, Ser. No. 733,257
Int. Cl. A23l *1/26*

U.S. Cl. 99—78 **5 Claims**

Corn syrup solids, an artificial sweetener, and a coloring agent are blended and mixed with water to form a bulking agent solution. The solution is dried to density of 0.05 to 0.3 g./cc. At least 50 percent by weight of the bulking agent is blended with flavoring and opacity agents to form a beverage mix. The bulking agent comprises at least 80 percent by volume of the beverage mix.

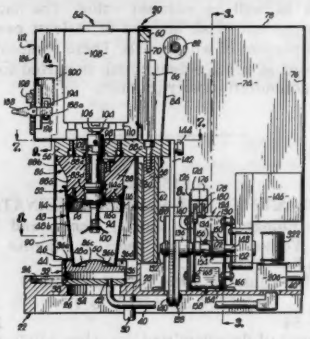
3,615,673

METHOD AND APPARATUS FOR PREPARING CARBONATED BEVERAGES WITHIN A CUP

Stewart L. Black, Lee's Summit, and John C. Littlefield, Kansas City, both of Mo., assignors to The Vendo Company, Kansas City, Mo.

Filed Dec. 20, 1968, Ser. No. 792,196
Int. Cl. A23l *1/00; F25c 7/00*

U.S. Cl. 99—79 **16 Claims**



A disposable cup containing beverage ingredients including ice is placed within a rigid receptacle. A closure is moved into the open top of the cup sealing its interior from the ambient atmosphere. A cutter carried by the closure is rotated within the cup to agitate the ingredients while carbon dioxide is forced into the cup through the closure at a pressure which would normally deform the cup walls. Following the agitation, the closure lifts out of the cup under the influence of the pressurized carbon dioxide. Means are disclosed to cleanse the closure and cutter.

3,615,674

PROCESS FOR BLENDING SELECTED FRACTIONS OF CEREAL GRAIN AND USE THEREOF

Edwin J. Bass, St. Paul, and William R. Johnston, Wayzata, both of Minn., assignors to International Multifoods Corporation, Minneapolis, Minn.

Filed Aug. 19, 1968, Ser. No. 753,407
Int. Cl. A23l *1/10, 1/14, 1/16*

U.S. Cl. 99—80 **9 Claims**

A process of blending selected fractions of a given cereal grain, to obtain a better balance of nutrient properties than obtained from the whole grain flour from said cereal grain. One blend is obtained through combining wheat fractions: second clear, wheat germ and millfeed. The blend is further processed by heating and increasing its moisture content to form pellets and then ground to provide a processed blend that is selectively converted into a base for soup, pudding, beverage, etc. through adding flavoring and/or coloring materials; or ground and then through the addition of other materials and further processing, converted into a pasta-like product.

3,615,675

METHOD FOR MAKING CENTER-FILLED PUFFED FOOD PRODUCT

Lawrence Wisdom, Dallas; David P. Fowler, Fort Worth, Tex., and Robert E. Zinn, Lexington, Mass., assignors to Frito-Lay, Inc., Dallas, Tex.

Filed July 31, 1967, Ser. No. 657,251
Int. Cl. A23l *1/10, 1/18*

U.S. Cl. 99—83 **11 Claims**

A light puffed or expanded food product which has a core filled with an edible pastelike or creamy material. The

apparatus for making this product includes an extruder capable of developing high pressures and elevated temperatures in a mass of edible material such as corn meal to which water and vegetable oil have been added. The material exits the extruder through an orifice, at which point the edible material expands significantly due to the vaporization of the water. through the orifice, a tube extends for the introduction of the core material into the center of the expanded material. The preferred but not essential length of the tube is more than 50 times its diameter, and its diameter increases progressively from the orifice toward the tube outlet. The filling material in the tube and the surrounding atmosphere cool and accelerate the hardening and maturing of the expanded material and eliminate vapor pockets in the core.

3,615,676

PROCESS FOR SUGAR COATING READY-TO-EAT CEREAL

William L. McKown, St. Louis Park, and Philip K. Zietlow, Wayzata, both of Minn., assignors to General Mills, Inc.

Filed Dec. 18, 1967, Ser. No. 692,630
Int. Cl. A23l *1/10*
U.S. Cl. 99—83 **10 Claims**

A sweetened, nonsticky, ready-to-eat cereal product and process for forming it. Crystalline sugar is applied to the surface of cereal pieces, and caused to adhere thereto by moistening the cereal pieces with a solution formed of water and an edible binding agent.

3,615,677

HIGH PROTEIN ALIMENTARY PASTE PRODUCTS

Rudolph Karl Scharschmidt, Battle Creek, Mich.; Lee F. Aubel, Santa Ana, Calif., and Morton Kaplan, Battle Creek, Mich., assignors to General Foods Corporation, White Plains, N.Y.

Filed Feb. 6, 1970, Ser. No. 9,433
Int. Cl. A23l *1/16*
U.S. Cl. 99—85 **15 Claims**

Alimentary paste products, high in protein but low in cost, are prepared from corn flour, soy flour of NSI of greater than 50 and wheat flour by shaping a dough made from the blended flours and drying the shaped dough. Either conventional paste drying of the shaped dough can be employed or the shaped dough pieces can be rapidly dried at elevated temperatures, provided the starch in the dough is at least partially gelatinized at some point during the process.

3,615,678

PROCESS FOR MAKING COVERED PIZZA

Frank P. Tangel, Oakland, and Argillo Musetti, Fairlawn, both of N.J., assignors to Buitoni Foods Corporation

Filed Oct. 31, 1968, Ser. No. 772,078
Int. Cl. A21d *8/06*
U.S. Cl. 99—86 **7 Claims**

A process for producing pizza having two dough layers with a tomato base sauce in a pocket between them; the dough is made of durum flour and leavening, is formed into sheets, a quantity of sauce is placed between the sheets, the raw pizza being then proofed, and cooked between plates having a predetermined spacing.

3,615,679

FROZEN PIZZA AND DOUGH

Frank P. Tangel, Oakland, and Argillo Musetti, Fairlawn, both of N.J., assignors to Buitoni Foods Corporation

Filed Oct. 31, 1968, Ser. No. 772,389
Int. Cl. A21d *13/08*
U.S. Cl. 99—86 **21 Claims**

The present invention relates to a frozen food product in the nature of a pizza which may be baked to completion in an ordinary toaster. This food product has two layers of leavened dough sealed at the edges and forming a pocket therebetween in which is a filling of tomato sauce and cheese. A dough is provided of Durum wheat, leavening and other ingredients.

3,615,680

HOME BAKING PROCESS

Richard Grant Henika, Alamo; John C. Colmey, Diablo, and Marlene R. Henselman, Pleasanton, all of Calif., assignors to Foremost-McKesson, Inc., San Francisco, Calif.

Filed Nov. 19, 1968, Ser. No. 776,884
Int. Cl. A21d *2/28, 2/04, 8/02*
U.S. Cl. 99—90 R **14 Claims**

A home process for making leavened bread, rolls, buns, sweet goods, in a relatively short period of time, with minimal requirements for working and kneading of the dough, and with a high degree of tolerance to processing errors. Baked produces can be satisfactorily produced in less than 90 minutes, and kneaded and leavened dough is ready for proofing and baking in less than 30 minutes. The processing involves mixing of essential dough ingredients with gluten activating and maturing agents, with the activating agent being present at levels sufficient to react with substantially all of the protein in the dough to achieve desired dough viscosities in a very short mixing period, as determined by dough development and extensibility. Starch modifying agents are also used for improvement of flavor and dough properties. Slow acting oxidants or maturing agents are also advantageously employed.

3,615,681

YEAST-RAISED BAKED PRODUCTS AND METHOD FOR PREPARING SAME

James W. DuRoss, Claymont, and William H. Knightly, Wilmington, both of Del., assignors to Atlas Chemical Industries, Inc., Wilmington, Del.

Filed Nov. 12, 1968, Ser. No. 775,128
Int. Cl. A21d *2/16*
U.S. Cl. 99—91 **6 Claims**

A yeast-raised baked product containing a surfactant blend comprising a monoglyceride and polyglycerol esters of higher fatty acids. In the preparation of the final baked product the surfactant blend may be carried by the shortening or added directly to the dough or sponge in the batch method of preparation or to the liquid brew or sponge in the continuous bread-making process.

3,615,682

PASTRY MIX AND MARGARINE THEREFOR

Glenn D. La Baw, Greenwich, Conn.; David P. Kidger, Glen Rock, and Fred Vanderveer, Mahwah, N.J., assignors to National Biscuit Company

Filed Sept. 7, 1967, Ser. No. 666,566
Int. Cl. A23d *3/00;* **A21d** *13/08*
U.S. Cl. 99—92 **9 Claims**

A superior margarine for laminated doughs capable of entrapping up to 25 percent by volume of air, is prepared from 80–86 percent of partially hydrogenated soybean oil, 0.0–1 percent of an emulsifier, 12–16 percent water, and 0–4 percent salt. Coloring agents, flavoring agents and milk solids are optional. The soybean oil is hydrogenated to an iodine value of 65–70, under conditions to give Solid Fat Indices 43–47 at 10° C, 28–32 at 21.1° C, 23–27 at 26.7° C, 10.5–14.5 at 33.3° C, 1.5–4.5 at 37.8° C. and 2 maximum at 40° C.

3,615,683

USE OF MICROWAVES FOR BAKING

Peter Xenophon Hoynak, Fort Lee, N.J., assignor to CPC International Inc.

Filed May 2, 1968, Ser. No. 726,238
Int. Cl. A21d *13/08*
U.S. Cl. 99—92 **1 Claim**

The present invention relates to the baking of cakes by the use of microwaves. More particularly, the present invention relates to the use of dextrose in a cake formulation which is subsequently baked in a microwave oven. It has been discovered that dextrose may be freely used in cake formulations without development of color when the cake formulation is baked in a microwave oven.

3,615,684

PASTRY SHELL MIX

Robert Workin, Valley Stream, N.Y., assignor to International Multifoods Corporation, Minneapolis, Minn.

Continuation-in-part of application Ser. No. 782,415, Dec. 8, 1968, now abandoned. This application Feb. 19, 1969, Ser. No. 800,755

Int. Cl. A21d *13/08*

U.S. Cl. 99—94 3 Claims

A pastry shell mix for producing a product by the addition of water and baking consisting essentially of gelatinized wheat flour, gelatinized corn flour, gelatinized wheat starch and/or gelatinized corn starch; gelatinized tapioca starcy, fat, salt and as optional ingredients leavening and sodium caseinate.

3,615,685

PREPARATION OF ACTIVE DRY YEAST

Eric Fantozzi, Alloa, Scotland, and William E. Trevelyan, Surrey, England, assignors to The Distillers Company (Yeast) Limited, Surrey, England

Filed Nov. 19, 1968, Ser. No. 777,160

Claims priority, application Great Britain, Nov. 23, 1967, 53280/67

Int. Cl. A23j *1/18*

U.S. Cl. 99—96 5 Claims

An aqueous suspension of yeast is sprayed into a drying atmosphere. The conditions are selected so that the average particle size of the product is between about 15 and about 500 microns, preferably 20 and 200 microns and its dry matter content is between about 27 percent and about 50 percent, preferably 40 to 45 percent by weight. Further drying can be effected under mild conditions avoiding mechanical agitation or pressure to give an active dried yeast product containing up to about 97 percent, by weight, of dry matter.

3,615,686

SHAPING OF FOODSTUFFS

Robert Swinburn Marshall, Lowestoft, England, assignor to Lever Brothers Company, New York, N.Y.

Filed July 30, 1969, Ser. No. 845,970

Claims priority, application Great Britain, Aug. 5, 1968, 37343

Int. Cl. A23p *1/00*

U.S. Cl. 99—100 P 7 Claims

A method of forming unit portions of foodstuffs such as reformed shrimp in which the food material is extruded through a nozzle which is of distorted or helical form while in a frozen state and is then subdivided and set in its distorted or helical form.

3,615,687

METHOD FOR PRODUCING CANDIED FRUITS

Kazuo Mochizuki, Takarazuka; Kazuko Isobe, Osaka, and Yoshio Sawada, Fukushima, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Aug. 29, 1967, Ser. No. 663,946

Claims priority, application Spain, Aug. 29, 1966, 330,686

Int. Cl. A23l *1/06*

U.S. Cl. 99—102 9 Claims

The time required for candying fruits such as cherries, apricots, plums, prunes and jujubes is remarkably shortened by preliminarily immersing the said fruits in an aqueous solution of the enzymatic composition produced by the cultivation of *Aspergillus niger* and thereafter carrying out the candying process.

3,615,688

METHOD OF MANUFACTURING A SHAPED WHOLE TISSUE HEAT-PROCESSED MEAT PRODUCT

Francis G. Connick, Downers Grove, and Warren R. Schack, Western Springs, both of Ill., assignors to Swift & Company, Chicago, Ill.

Filed Apr. 5, 1968, Ser. No. 719,225

Int. Cl. A22c *18/00*; A23b *1/00*

U.S. Cl. 99—107 3 Claims

Various innovations and improvements are applied to segments of whole meat which are reformed and molded under predetermined conditions, packed into containers and heat processed. The resulting meat product is bound together in a composite mass conforming substantially to that of the interior of the container and possessing a third phase adhesive boundary line between the meat chunks that is substantially undetectable to the naked eye.

3,615,689

POULTRY PROCESSING

Sidney Malinow, Hickory Hills; David R. Erickson, Downers Grove, and Charles A. Overley, Chicago, all of Ill., assignors to Swift & Company, Chicago, Ill.

Filed Apr. 8, 1968, Ser. No. 719,733

Int. Cl. A22c *21/00*

U.S. Cl. 99—107 3 Claims

Certain eating qualities of meat items, particularly poultry, are improved by injecting therein quantities of an edible emulsion having a melting point between about 76°–110° F. and a relatively narrow plastic range, such as is obtained by emulsifying a minor amount of water with a major amount of vegetable oil product comprised preferably of a lauric acid oil or mixtures of lauric oil and other oils or fats and/or hydrogenated forms and mixtures thereof, using a small amount of a mixed hydrophilic-lipophilic emulsifier and ingredients such as salt, flavoring and coloring materials, etc.

3,615,690

PREPARATION OF MEAT AND CHEESE PRODUCT

Frank J. Pratl, Lisle, and Frank D. Schampel, Lombard, both of Ill., assignors to Armour and Company, Chicago, Ill.

Filed Nov. 12, 1968, Ser. No. 775,099

Int. Cl. A22c *18/00*

U.S. Cl. 99—107 10 Claims

Lean and fat meat, water, seasoning and flavoring materials together with gelatin are cooked, cooled, and pizza cheese incorporated in the mixture to bring the cheese to a stringy state, the mixture being introduced into a mold and chilled to shape the mixture as a solid mass, the gelatin being in an amount whereby upon chilling the mixture, the mixture becomes solid and sliceable, but when heated above about 110° F. breaking up the mass into a flowable, spreadable body.

3,615,691

PRESERVATION OF MEAT COLOR

Adrianus Henricus Antonius Van Den Oord, Duiven, and De Vries, Bartholomeus, Arnhem, both of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Jan. 27, 1969, Ser. No. 794,360

Claims priority, application Great Britain, Feb. 2, 1968, 5,328/68

Int. Cl. A23b *1/00*; A23l *3/34*

U.S. Cl. 99—107 8 Claims

Meat products are given a stabilized color by means of tetrazole.

3,615,692

METHOD OF PREPARING A STUFFED POULTRY LEG

Kenneth O. Lovell, St. Louis, Mo., assignor to Ralston Purina Company, St. Louis, Mo.

Filed June 30, 1969, Ser. No. 837,662
Int. Cl. A22c *21/00*; A23b *1/00*
U.S. Cl. 99—107 4 Claims

A poultry product having a shape resembling the leg portion thereof is formed by removing the meat and skin from the femur and tibia portion of the leg in such a manner as to form a pocket in the tibia portion of the meat. The pocket may then be filled with a stuffing material and the meat portion which was around the femur bone folded over to form a stuffed poultry product resembling the leg thereof and which will retain the stuffing when subjected to cooking.

3,615,693

PROCESS FOR PREPARING READY-TO-EAT MEAT PRODUCTS

Fred W. Billerbeck, Jr., and Kerry S. Shoemaker, both of Fremont, Mich., assignors to Gerber Products Company, Fremont, Mich.

Filed Sept. 7, 1967, Ser. No. 666,003
Int. Cl. A22c *18/00*; B02c *18/00*
U.S. Cl. 99—108 2 Claims

A meat-containing product including particulate meat portions produced through conversion of the raw animal flesh to an emulsified form by subjecting the raw meat to sufficient size reduction to destroy the tissue structure. The emulsified particles, of indiscernible size, are reformed (shaped) into portions of discernible size and heated, to at least the denaturation temperature of the raw meat, at a rate sufficient to maintain the reformed portions substantially intact. The resulting reformed meat portions have excellent mastication and digestion characteristics and are especially useful in the preparation of infant food.

3,615,694

PROTEINACEOUS FLAVORING AGENT AND METHOD OF MAKING SAME

William P. O'Donnell, Cherry Hill, N.J., assignor to Camden Food Specialties Co., Inc., Camden, N.J.

Filed June 3, 1968, Ser. No. 733,781
Int. Cl. A23l *1/22*
U.S. Cl. 99—140 R 1 Claim

The water soluble protein residue from a low temperature edible beef fat-rendering process is hydrolyzed with hydrochloric acid, filtered, and the solution condensed by steam distillation to a 45 to 55 weight percent solute level. This material is filtered, and the resulting solution forms a useful proteinaceous flavoring agent for soup bases.

3,615,695

SOURDOUGH FLAVORING COMPOSITION AND METHOD OF MAKING SAME

Anthony J. Luksas, Chicago, Ill., assignor to Beatrice Foods Co., Chicago, Ill.

Filed July 8, 1968, Ser. No. 743,049
Int. Cl. A23l *1/22*; A23c *9/12*
U.S. Cl. 99—140 9 Claims

A casein containing material, preferably skim milk, is acidified with lactic acid or lactic acid forming bacteria, incubated with rennet until curd forms. The curd is separated, suspended in water or salt solution, innoculated with Citrobacter and fermentation carried out with aeration and agitation. The finished product has the odor and flavor of sourdough and can be used as a liquid or spray dried.

3,615,696

YEAST SENSORY STIMULATOR AND PROCESS OF MAKING SAME

Loren B. Sjostrom, Wakefield, and John H. Moriarty, Melrose, both of Mass., assignors to Ancheuser-Busch, Incorporated, St. Louis, Mo.

Filed July 22, 1968, Ser. No. 746,237
Int. Cl. A23l *1/22*; A23c *9/12*
U.S. Cl. 99—140 R 9 Claims

Yeast sensory stimulator factor produced during the growth of *L. casei* on a suitable yeast sensory stimulator producing media. This factor, when added to food and beverage products, produces taste and salivating characteristics readily discernible to trained flavor panelists.

3,615,697

LACTIC FERMENTED MALT PRODUCT AND PROCESS OF PRODUCING SAME

Clifford M. Hollenbeck, Manitowoc, Wis., assignor to Red Arrow Products Company, Milwaukee, Wis.

Filed Oct. 29, 1968, Ser. No. 771,662
Int. Cl. A23l *1/22*; A21d *2/26*
U.S. Cl. 99—140 R 17 Claims

A dry powdered additive for supplying malt flavor and lactic sourness to starch based foodstuffs is produced by anaerobically fermenting an aqueous dispersion of malt flour, advisably in whey, with a lactic acid producing microorganism, removing the water, and grinding the product to a flour.

3,615,698

A METHOD FOR PREPARING SNYTHETIC HAM- AND BACON-FLAVORED COMPOSITIONS

Paul D. Thomas, Groton, Conn., assignor to Pfizer Inc.

Filed Dec. 31, 1968, Ser. No. 788,321
Int. Cl. A23l *1/22*
U.S. Cl. 99—140 N 8 Claims

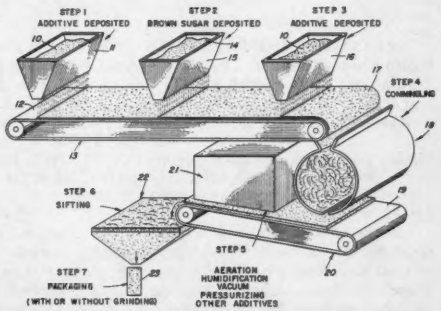
A method for preparing synthetic ham- and bacon-flavored compositions comprising reacting, at elevated temperature, amino acids, sugars, vegetable protein hydrolysate, monosodium glutamate, and edible fat, and, after cooling, further adding 5'-ribonucleotides and hickory-smoke flavor.

3,615,699

PREPARATION OF FREE-FLOWING BROWN SUGAR COMPOSITION

Justin Melvin Mickevicz, Chicago, Ill., assignor to Pro-Col Corporation, Chicago, Ill.

Continuation-in-part of application Ser. No. 428,615, Jan. 28, 1965, now abandoned, Continuation-in-part of application Ser. No. 241,825, Dec. 3, 1962, now abandoned. This application Oct. 13, 1965, Ser. No. 495,389
Int. Cl. C13f *3/00*
U.S. Cl. 99—141 2 Claims



Free-flowing brown sugar which retains its normal moisture content is prepared by (1) diffusing both (a) brown

sugar and (b) finely divided wood cellulose, microcrystalline cellulose or sugar cane cellulose and (2) commingling these materials in their diffused condition without subjecting the mixture to any substantial degree of pressure. Flavoring fats or oils may be incorporated in the previously formed mixture.

3,615,700

α-TETRAZOLYL-6-SUBSTITUTED-TRYPTAMINE AND α-TETRAZOLYL-5,6-DISUBSTITUTED-TRYPTAMINE SWEETENING COMPOSITIONS AND THEIR USE

Edmund C. Kornfeld, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed July 5, 1968, Ser. No. 742,490
Int. Cl. A61k *7/16, 27/00;* **A23l** *1/26*
U.S. Cl. 99—141 A **11 Claims**

α-Tetrazolyl-6-substituted-tryptamine and α-tetrazolyl-5,6-disubstituted-tryptamine compounds useful as nonnutritive sweetening agents, and intermediates for the preparation thereof.

3,615,701

MAPLE FLAVORING CONCENTRATE AND METHOD FOR MAKING SAME

Worth C. Goss, 4704 Lake Washington Blvd., Kirkland, Wash.

Filed Oct. 5, 1967, Ser. No. 673,006
Int. Cl. A23l *1/26*
U.S. Cl. 99—142 **17 Claims**

Maple flavoring concentrate product and method for making same wherein four, five and six carbon reducing sugars, principally five carbon, are subjected to controlled oxidation and dehydration steps, giving a controlled caramelization. Dehydration may be carried out separately or simultaneously with oxidation though oxidation is accomplished in an alkaline solution with the pH maintained by calcium or barium hydroxide. After dehydration and oxidation the calcium or barium ions are removed from the solution to give a relatively strong acid pH. Finally the solution is adjusted to a weak acid pH by the addition of food grade potassium, sodium or calcium hydroxides or carbonates to give the maple flavoring concentrate.

3,615,702

LIQUID SALAD DRESSING BASE

Horton E. Swisher, Upland, Calif., assignor to Sunkist Growers, Inc., Los Angeles, Calif.

Filed Dec. 18, 1968, Ser. No. 784,873
Int. Cl. A23l *1/24*
U.S. Cl. 99—144 **6 Claims**

Liquid salad dressing base of an edible oil carrying oil-insoluble particles of essential oil in emulsion form in a water-soluble matrix, whereby upon addition of an aqueous phase and shaking the water-soluble matrix dissolves forming a finished salad dressing containing all the necessary oil, flavor and aqueous materials.

3,615,703

RETAINING THE FRESHNESS OF FOODSTUFFS

Yujiro Harada; Yasushi Kanzaki; Hideyuki Furukawa; Kazuo Yamazaki, and Hideki Matsuo, all of Tokyo-to, Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, (Kyowa Hakko Kogyo, Ltd.), Tokyo-to, Japan

Filed Oct. 22, 1968, Ser. No. 769,726
Claims priority, application Japan, Oct. 23, 1967, Oct. 23, 1967, June 23, 1969; 42/67838, 42/67837, 44/50121
Int. Cl. A23b *7/00;* **A23l** *3/00*
U.S. Cl. 99—154 **5 Claims**

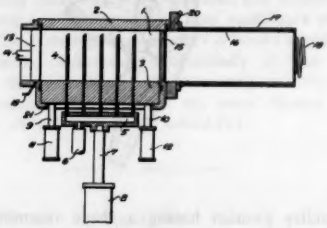
This invention relates to a process and composition for retaining the freshness of foodstuffs involving the addition of at least one member selected from the group consisting of lysine, ornithine, histidine, arginine and salts thereof to the foodstuff so as to thereby retain its freshness. This invention is useful for preserving foodstuffs for a long period of time without any deteriorative influence upon their qualities.

3,615,704

METHOD OF INJECTING PICKLING MEDIUM INTO FOODS

Knud George Pedersen, Birkerod, Denmark, assignor to Slagteriernes Forsknings-Institut, Roskilde, Denmark

Filed Dec. 4, 1967, Ser. No. 687,661
Claims priority, application Denmark, Dec. 9, 1966, 6389
Int. Cl. A23b *1/01*
U.S. Cl. 99—159 **2 Claims**



A method of an apparatus for injecting a preservative or pickle such as brine into foods through injection needles or nozzles and by which the food is compressed and the injection made under simultaneous expansion of the food, said process being carried out in an apparatus with a closed chamber from which the food after the injection is moved directly to a container without allowing any substance of nutritious value to escape from the food.

3,615,705

PROCESS FOR THE PASTEURIZATION OF EGG WHITES

Willibald F. Kohl, Nanuet; John C. Sourby, Mt. Kisco, N.Y., and Rudolph H. Ellinger, Chagrin Falls, Ohio, assignors to Stauffer Chemical Company, New York, N.Y.

Continuation-in-part of application Ser. No. 694,850, Jan. 2, 1968. This application Apr. 28, 1970, Ser. No. 032,760
Int. Cl. A23b *5/00;* **A23l** *1/32*
U.S. Cl. 99—161 **6 Claims**

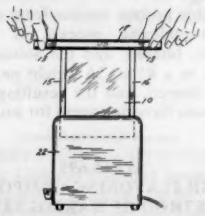
A process for pasteurizing egg whites which comprises the steps of raising the pH of the egg whites about 0.5 to 1.5 units above the natural pH thereof. The egg whites are then heated to destroy the natural catalase. Then, a responsive amount of a peroxide material is added to the egg whites which are then reheated to a pasteurization temperature.

3,615,706

FOOD PACKAGE

Radcliffe Franklin Robinson, Highland Park, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Apr. 14, 1964, Ser. No. 367,361
Int. Cl. B65b *25/06;* **B65d** *5/46, 5/56, 5/62*
U.S. Cl. 99—171 H **16 Claims**



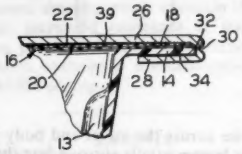
A sealed package for holding, transporting, and heating food comprising a container of a size to fit in the slot of a toaster and formed of an electrically conductive material with a heat stable, nonconductive coating disposed on its exterior so that no conductive material or raw edges are exteriorly exposed.

3,615,707

HERMETICALLY SEALED CONTAINER WITH READILY DETACHABLE PROTECTIVE COVER

William F. Filz, Portland, Oreg., assignor to North Pacific Canners & Packers, Inc., Portland, Oreg.

Filed Mar. 18, 1970, Ser. No. 20,723
Int. Cl. B65b *25/00*
U.S. Cl. 99—171 S 7 Claims



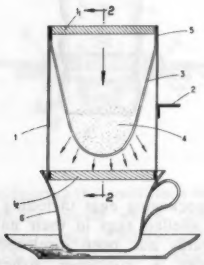
A hermetically sealed frozen food container includes a dishlike tray of high-density polyethylene, a lip extending from the upper peripheral surface of the tray, a laminated plastic hermetically sealed closure member comprising a lower layer of polyethylene and an upper layer of polyester resin, the lower layer of polyethylene being heat sealed to the upper surface of the lip on the tray, and a fiberboard cover disposed above the closure member and adapted to protect the same and serve as a surface for advertising and other printed matter. The fiberboard cover has two downwardly and inwardly bent flanges on opposed edges thereof, the flanges being adapted to fold under the lips on the tray on the sides thereof in register with the flanges. The flanges are adhered to the undersides of the lip along the sides of the tray with which they are in register. The unflanged edges of the cover are unattached to the lip along the sides in register with them. The cover is deeply scored along the lines of fold of the flanges, whereby the major portion of the cover may be readily detached from the container merely by tearing the same along such scored lines, the flanges thereafter remaining adhered to the undersides of the lip.

3,615,708

INDIVIDUAL FILTER FOR PRESERVING AND PREPARING BEVERAGES

Emile Jean Maurice Abile-Gal, 27 rue du General Fay, Paris, France

Filed July 18, 1968, Ser. No. 745,919
Claims priority, application France, Aug. 11, 1967, 117,803
Int. Cl. B65d *37/00*
U.S. Cl. 99—171 P 6 Claims



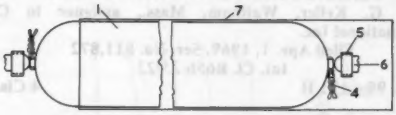
Individual filter for preserving portions for making a beverage by contact with a fluid, this filter being made of a cylindrical external casing in which a filtering pouch is fixed containing a portion of substance, the ends of the casing being closed in a sealtight manner for tearing with a view to the passage of the fluid for making the beverage.

3,615,709

PLASTIC FILM PACKAGE CONTAINING CONTENTS UNDER SUPERATMOSPHERIC PRESSURE

Andrew George Ford, Hitchin, and Ronald Augustus Hudson, Welwyn Garden City, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Aug. 1, 1968, Ser. No. 749,430
Claims priority, application Great Britain, Aug. 1, 1967, 35335/67
Int. Cl. B65d *45/16, 81/20*
U.S. Cl. 99—171 S 7 Claims



A package comprising a container formed of oriented film of polyethylene terephthalate, containing a gas under pressure, e.g. a carbonated drink.

3,615,710

PACKAGING MATERIALS FOR COMESTIBLES

Yoon Chai Lee, and Quirino A. Trementozzi, both of Springfield, Mass., assignors to Monsanto Company

Filed Nov. 15, 1968, Ser. No. 776,250
Int. Cl. B65b *3/00*
U.S. Cl. 99—171 LP 20 Claims

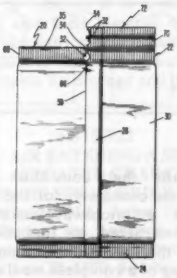
Disclosed herein are packaging materials having oxygen permeability of no more than 3.0 cc./100 sq. in./24 hr./atmos/mil at 73° F. and water permeability of no more than 3.0 gms./24 hr./100 sq. in./mil at 73° F. The materials are based upon interpolymers of methacrylonitrile with at least one monovinylidene aromatic compound wherein the methacrylonitrile constitutes 70–98 percent by weight of the interpolymer.

3,615,711

PACKAGE FOR STORING AND HEATING FOOD AND METHOD OF FORMING SAME

Joseph Markus, Hicksville, L.I.; James H. Rowe, New Hyde Park, L.I., N.Y., and John B. Sortor, Oakland, N.J., assignors to National Biscuit Company, New York, N.Y.

Filed Jan. 27, 1969, Ser. No. 794,307
Int. Cl. B65d *81/34*
U.S. Cl. 99—171 H 8 Claims



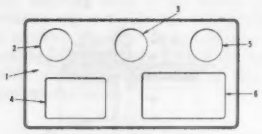
A package for containing and storing food and heating the contained food in a toaster including a top margin folded upon itself at least twice, a longitudinal margin folded upon itself and flattened to the package to form a longitudinal fold line, and a tear notch aligned with the longitudinal fold line whereby the package may be vented by tearing through the top margin on the longitudinal fold line from the tear notch and the food may be readily removed after tearing the

longitudinal fold line by pulling the longitudinal margin from the top to the bottom of the package. A method of forming the package including spacing food portions along a strip of sheet material, folding the sides of the sheet material over the food portions, forming the longitudinal margin by sealing the side edges of the strip and folding the longitudinal margin upon itself, sealing the strip at areas between food portions, severing the strip to form top and bottom margins, folding the top margin upon itself twice, and cutting a tear notch at the top margin.

3,615,712
PLASTIC FOOD POUCH FOR COOKING
Robert G. Keller, Waltham, Mass., assignor to CPC International Inc.
Filed Apr. 1, 1969, Ser. No. 811,872
Int. Cl. B65b *25/22*
U.S. Cl. 99—171 H **4 Claims**

A "cooking pouch" for foodstuffs such as pasta (e.g. noodles, macaroni, spaghetti), rice, and the like is formed from two separate films, preferably made of heat-sealable plastic, which are sealed together at the edges. One of the films is perforated over a substantial portion of its area, while the other is substantially imperforate, except it may optionally contain a line of weakness such as a perforated line to facilitate opening, and is made of a clear, transparent material.

3,615,713
SELECTIVE COOKING APPARATUS
Peter N. Stevenson, Belmont, Mass., assignor to Teckton, Inc., Waltham, Mass.
Filed Sept. 12, 1969, Ser. No. 857,510
Int. Cl. A23l *3/10*
U.S. Cl. 99—171 H **3 Claims**



Various foodstuffs that constitute a meal are each contained in separate containers for the purpose of cooking the foodstuffs in a microwave oven. The individual containers are constructed so that different degrees of radiation occur to the foodstuffs contained therein, thereby allowing the cooking of a complete meal at one time.

3,615,714
IMPROVED CONTAINER
Lloyd A. Nelson, Fremont, Mich., assignor to Gerber Products Company, Fremont, Mich.
Filed Sept. 17, 1969, Ser. No. 869,434
Int. Cl. B65d *55/02*
U.S. Cl. 99—171 C **2 Claims**

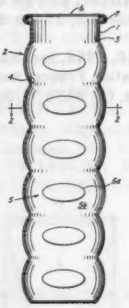
A resealable container including a body portion, a threaded cover disposed in sealing relation with the body portion, at least one elongated segment of fracturable pressure sensitive adhesive tape having first and second ends

secured lengthwise across the cover and body portion, and a severable label at least partially surrounding the body portion and overlapping the tape at about the body portion.

3,615,715
FILM FORMATION FROM NONHEAT COAGULABLE SIMPLE PROTEINS WITH FILLER AND RESULTING PRODUCT
Joseph D. Mullen, Golden Valley, Minn., assignor to General Mills, Inc.
Filed Mar. 16, 1970, Ser. No. 20,032
Int. Cl. A22c *13/00;* **B29d** *23/06;* **C08h** *1/00;* **D01f** *9/04*
U.S. Cl. 99—176 **22 Claims**

Films are formed by extruding plastic masses containing particulate silica or silicate and derived from nonheat coagulable simple proteins. The films find value as edible packaging materials and in the form of casings are useful in sausage making and the like.

3,615,716
APPARATUS FOR PACKAGING EGGS
James F. Poulos, Golden, Colo., assignor to Harry R. Combs, Denver, Colo., a part interest
Filed Dec. 30, 1969, Ser. No. 889,251
Int. Cl. A23b *5/00*
U.S. Cl. 99—177 **10 Claims**



A method of packaging eggs including shelling the eggs and loading the shelled eggs in their natural state into a packaging apparatus has been disclosed. The packaging apparatus includes a container structure divided by restriction means into a plurality of interconnecting egg-receiving compartments. Several embodiments of the packaging apparatus are disclosed, and the restriction means operates to restrict the tendency of shelled eggs from flowing from one compartment to another so as to prevent the eggs from mixing during transport and to permit the extraction of one or more eggs at a time from the container structure. Closure means are also disclosed for tightly closing the container structure.

3,615,717

PROCESS OF INHIBITING STALING OF MILK PRIOR TO STERILIZATION

Dee Rich Morgan, Liverpool; Delmar Lloyd Andersen, Syracuse, and Cloyce L. Hankinson, Camillus, all of N.Y., assignors to The Borden Company, New York, N.Y.

Filed Oct. 16, 1967, Ser. No. 675,291
Int. Cl. A23c *9/08*
U.S. Cl. 99—183 2 Claims

This invention relates to a new and improved process for inhibiting the development of stale flavors in milk products during the storage thereof, and to new and useful milk products obtained thereby which maintain their fresh flavors and display an increased resistance to staling upon being stored for long periods of time. More particularly, it relates to milk products containing a bioflavonoid in an amount sufficient to inhibit staling.

3,615,718

PROCESS FOR THE PREPARATION OF FROZEN CONFECTIONS, FOOD MIXES THEREFOR, AND AEROSOL PACKAGES CONTAINING SUCH MIXES

David Weinstein, Baltimore, Md., assignor to Arthur Ozner, Bellvale, N.Y.; Joseph Herman, Union; Elmer Schuman, Scotch Plains, N.J. and George Diamond, Glen Gardner, N.Y., part interest to each

Continuation-in-part of application Ser. No. 589,225, Oct. 25, 1966, which is a continuation-in-part of application Ser. No. 560,260, June 24, 1966, now abandoned. This application June 26, 1967, Ser. No. 648,967
Int. Cl. A23g *5/00*; B65b *31/00*
U.S. Cl. 99—189 29 Claims

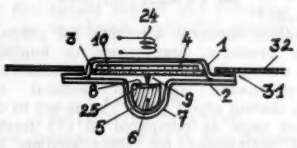
Ice cream, ice milk and sherbet mixes having specific compositions and solids contents contained in an aerosol dispenser under pressure and having dissolved therein a gaseous propellant to such a degree that on discharge from the dispenser in a chilled condition the ice cream and ice milk mixes are whipped to an overrun of at least 160 percent, while the sherbet mix is whipped to an overrun of at least 80 percent, all of such discharged mixes being capable of being frozen without separation of liquid.

3,615,719

APPARATUS FOR INDICATING THE THERMAL HISTORY OF DEEP-FREEZE PRODUCTS PARTICULARLY FOODS

Johann Michel, Ulmerstrasse 160a; Charlotte Keller, Blutenstrasse 4, and Hans-Joachim Keller, Blutenstrasse 4, all of Augsburg, Germany

Filed Dec. 14, 1967, Ser. No. 690,456
Claims priority, application Germany, Dec. 19, 1966, M 72071
Int. Cl. A23b *3/06*; G01d *21/00*
U.S. Cl. 99—192 TT 5 Claims



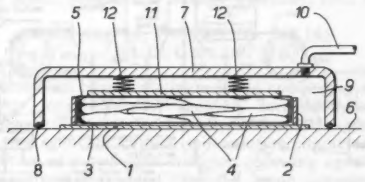
A system for indicating the conditions of storage and treatment of deep-frozen goods which consists of a sealed receptacle containing a pair of interactable components, one of which is flowable while the other is absorptive and capable of producing a visible indication of the degree of interaction. The liquid component is retained in a closed vessel within the receptacle and, also within the receptacle, means is provided for permitting escape of the liquid at a predetermined instant. The liquid is separated from its coacting component also by a liquid-soluble barrier which may be omitted in limited regions to permit direct action immediately upon openings of the liquid-storage vessel and thereby indicate directly the fact that the device is functioning.

3,615,720

METHOD FOR THE PRODUCTION OF DEEP-FROZEN FISH FILLET BLOCKS

Leif Brudal Knutrud, Oslo, Norway, assignor to Frionor Norsk Frossenfisk A/L, Oslo, Norway

Filed Dec. 12, 1968, Ser. No. 783,357
Claims priority, application Norway, Dec. 15, 1967, 171,000
Int. Cl. A23b *3/06*
U.S. Cl. 99—195 3 Claims



After fish fillets have been packed in a surrounding, but not airtight packing and before the fillet mass is frozen to a block, said packing with the fillet mass therein is subjected to a separate process step involving the application of a nearly total vacuum and the subsequent abrupt removal thereof. The air in the voids between the individual fillets in the mass and between the fillets and the surrounding walls of the package is withdrawn from the voids when the vacuum is applied. When the vacuum is removed, all the enclosed voids will collapse, i.e. not only the voids within the block but also the voids opening onto the boundaries thereof, since the latter voids are closed by the walls of the packing.

3,615,721

METHOD FOR THE MANUFACTURE OF FOOD FROM PLANT MATERIAL

Henri C. Silberman, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Dec. 26, 1967, Ser. No. 693,180
Int. Cl. A23b *7/00*; A23k *1/14*
U.S. Cl. 99—199 1 Claim

The present invention refers to an edible product and a process for making same from food materials and food by-products by treating the same with a mixture of enzymes (i.e. an enzyme mixture which exhibits catalytic cellulase, hemicellulase and pectinase activity), mechanically treating the food material to convert it to a slurry or a paste and thereafter forming said food material by casting, spraying, extruding or the like into a mechanically strong, flexible, cohesive food product in the form of a sheet, ribbon, strand, band or the like suitable for storage and drying the same.

3,615,722

FILTERING AIR ENTERING A SPRAY-DRIER THROUGH ACTUATED CHARCOAL IN THE PREPARATION OF SPRAY DRIED WHOLE MILK

Floyd E. Kurtz, Bethesda, Md.; Arjen Tamsma, and Michael J. Pallansch, Arlington, Va., assignors to The United States of America as represented by the Secretary of Agriculture

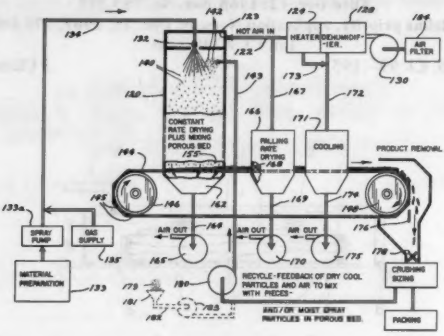
Filed Jan. 29, 1970, Ser. No. 6,921
Int. Cl. A23c *1/04*
U.S. Cl. 99—203 4 Claims

An improvement in the process producing spray-dried while milk wherein the air entering the spray-dryer is filtered through activated charcoal to remove the ozone therefrom. The flavor quality of the resulting product is preserved and prevented from deteriorating, and with ozone-free air the flavor quality of the spray-dried product is the same as the milk concentrate from which it is made.

3,615,723
SPRAY-DRYING APPARATUS

Reginald E. Meade, Stillwater, Minn., assignor to The Pillsbury Company, Minneapolis, Minn.

Continuation-in-part of application Ser. No. 553,101, May 26, 1966. This application Apr. 15, 1970, Ser. No. 28,780
Int. Cl. A23b *7/02*
U.S. Cl. 99—206 **15 Claims**

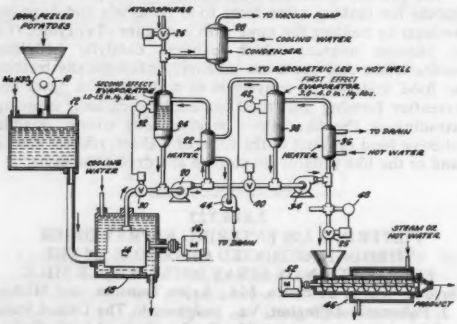


Process for drying fluid and solid material in which a liquid spray is introduced into a drying chamber together with a source of dry desiccating gas such as heated air. A screen is positioned to receive the spray while the droplets are in a tacky condition to form a mat on the screen with a provision for drawing air from the heated enclosure through the mat and thence through the screen for the purpose of drying the mat. At least portions of the mat are subdivided into a particulate form and recirculated back to the inlet of the apparatus where they are mixed with fresh incoming product.

3,615,724
PROCESS FOR PREPARING A DEHYDRATED POTATO PRODUCT DIRECTLY FROM RAW POTATO

Charles E. Sech, 5993 Winans Lake Road, Brighton, Mich.

Continuation-in-part of application Ser. No. 526,525, Feb. 10, 1966, now abandoned. This application June 12, 1969, Ser. No. 832,569
Int. Cl. A23b *7/03*
U.S. Cl. 99—207 **4 Claims**

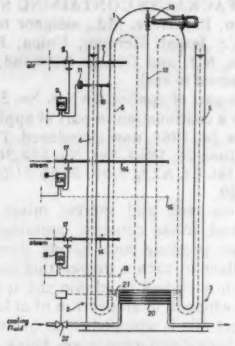


A process for the manufacture of a dehydrated potato product directly from raw potato without requiring the addition of any binder which is suitable for hot oil cooking or frying wherein a slurry of ground raw potato is formed having a moisture content of about 80 percent, the water content of the slurry then being reduced to at least 50 percent by application of vacuum at a temperature below the temperature of gelatinization of the potato particles. The mass is then heated or cooked at a temperature sufficiently high to gelatinize the product, the latter then being dried to a moisture content of about 6 percent to twelve percent. The critical step of dehydration by vacuum evaporation achieves proper plasticity of the mass while at the same time prevents browning of the product normally occurring due to enzymatic action, or oxidative influence or both.

3,615,725
METHOD AND APPARATUS FOR THE THERMAL TREATMENT UNDER PRESSURE OF COMMODITIES PACKED IN CONTAINERS

Johannes Bernardus van der Winden, Amstelveen, Netherlands, assignor to Gebr. Stork & Co's Apparatenfabriek N.V., Amsterdam, Netherlands

Continuation-in-part of application Ser. No. 570,896, Aug. 8, 1966, now abandoned. This application Mar. 2, 1970, Ser. No. 15,694
Int. Cl. A23l *3/04*
U.S. Cl. 99—214 **3 Claims**



Package commodities are transported into a treatment space which contains a mixture of steam and air maintained at 2 atm. gauge and 120° C. and a quantity of liquid at the bottom of the space. The liquid in the bottom of the space is cooled thereat to maintain its temperature below 100° C. The treatment space is isolated from the ambient atmosphere by inlet and outlet liquid locks which communicate with the liquid in the bottom of the space.

3,615,726
PROCESS FOR PASTEURIZING AND SEALING OYSTERS

David C. McMillan, Shelton, Wash., assignor to Olympia Oyster Company, Shelton, Wash.

Filed Apr. 14, 1969, Ser. No. 822,841
Int. Cl. A23l *1/33, 3/00*
U.S. Cl. 99—217 **5 Claims**

This invention concerns a method for preparing oysters and similar products, preparatory to holding them in refrigerated storage, by heating them by radiant energy in the so-called microwave spectrum without raising the temperature thereof about 170° F. so as not to destroy their firmness and taste as compared to (1) freshly shucked oysters (2) maintained for short periods of time at temperatures just above freezing.

3,615,727
METHOD OF PRESERVING

Armin Starke, Steirtweite 15, 2000 Hamburg 11, Germany

Filed Mar. 23, 1967, Ser. No. 625,371
Int. Cl. A23l *3/34*
U.S. Cl. 99—225 **3 Claims**

A method for stabilizing foodstuffs, other nutrients and pharmaceutical compositions comprising the features of providing the product with outwardly open capillary apertures and applying thereto under a vacuum substances in the form of gases or vapors.

3,615,728

METHOD FOR IMPARTING HICKORY SMOKE COLOR AND FLAVOR TO DRIED YEAST AND OTHER FOOD POWDERS

Aaron E. Wasserman, Philadelphia, Pa., assignor to The United States of America as represented by the Secretary of Agriculture

Filed Oct. 11, 1968, Ser. No. 766,952
Int. Cl. A23b *1/04*

U.S. Cl. 99—229 1 Claim

Hickory smoke color and flavor are imparted to yeast powder by treating it with hickory smoke components dissolved in a volatile solvent such as diethyl ether or ethanol.

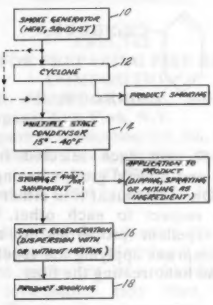
3,615,729

SMOKING OF FOOD PRODUCTS

Harvey O. Baker, Fort Wayne, Ind., and Johan E. Hoff, West Lafayette, Ind., assignors to Peter Eckrich & Sons, Inc.

Filed June 2, 1969, Ser. No. 829,285
Int. Cl. A23b *1/04, 3/04*

U.S. Cl. 99—229 6 Claims



A method of providing a low carcinogen content smoke aerosol for use in the smoking of food products. The removal of carcinogens from natural hardwood smoke is effected by cycloning conventionally generated smoke to remove a substantial portion of the particulate phase thereof and/or by regenerating a condensed natural hardwood smoke in the presence of heat. Products may be smoked in the conventional manner or by application of a condensed liquid smoke to a product by dipping, spraying or mixing the condensed liquid smoke into the product as an ingredient thereof. The process also provides the advantages of increasing the cleanliness of a smoke generating operation, reducing the fire hazard thereof and providing a smoking process that can be closely controlled thereby enhancing reproducibility.

3,615,730

PROTECTIVE COATING

Gabriel H. Law, Orange, and Paul D. Van Dorsten, Diamond Bar, both of Calif., assignors to Amercoat Corporation, Brea, Calif.

Filed Feb. 5, 1970, Ser. No. 9,043
Int. Cl. C09d *5/10*

U.S. Cl. 106—1 10 Claims

An inorganic zinc-rich coating for the protection of ferrous surfaces consisting of zinc dust in a vehicle comprising a substantially nonaqueous colloidal suspension of silica in ethylene glycol monoethyl ether or other polar solvent. Small amounts of zinc chloride and, optionally, magnesium oxide are added to the vehicle to promote film hardness. The coating may be prepared by fractional distillation of an aqueous, acid-stabilized colloidal silica sol premixed with a polar solvent, with subsequent addition of zinc chloride, magnesium oxide and zinc dust to the solvent dispersion.

3,615,731

METALIZING COMPOSITION

Oliver A. Short, Wilmington, Del., assignor to E. I. du Pont de Nemours, Wilmington, Del.

Division of Ser. No. 731,604, May 23, 1968, Pat. No. 3,539,114.
Filed Feb. 16, 1970, Ser. No. 11,868
Int. Cl. C09d *5/24*

U.S. Cl. 106—1 2 Claims

Metalizing compositions containing gold alloy flakes for decorative and electronic applications.

3,615,732

ELECTROLESS COPPER PLATING

Charles R. Shipley, Jr., Newton; Lucia H. Shipley, Newton; Michael Gulla, Newton, and Oleh B. Dutkewych, Medfield, all of Mass., assignors to Shipley Company, Inc., Newton, Mass.

Filed Aug. 13, 1968, Ser. No. 752,165
Int. Cl. C23c *3/02*

U.S. Cl. 106—1 16 Claims

An electroless copper plating solution comprising a source of cupric ions, hydroxyl radicals, formaldehyde or a formaldehyde precursor preferably paraformaldehyde, and a complexing agent for copper, said solution characterized by the addition of a hydrogen inclusion retarding agent and at least one member selected from the group consisting of a formaldehyde addition agent and a salt of a Group VIII metal of the Periodic Chart of the Elements. The electroless copper plating solution is capable of providing a rapid rate of copper deposition dependent upon the selection of the complexing agent without sacrifice in tensile properties of the copper deposit. The copper plate deposited from the electroless solution of this invention is distinguishable from prior art electroless copper deposits by substantially improved bending or ductility properties.

3,615,733

ELECTROLESS COPPER PLATING

Charles R. Shipley, Jr., Newton; Lucia H. Shipley, Newton; Michael Gulla, Newton, and Oleh B. Dutkewych, Medfield, all of Mass., assignors to Shipley Company, Inc., Newton, Mass.

Filed Aug. 13, 1968, Ser. No. 752,166
Int. Cl. C23c *3/02*

U.S. Cl. 106—1 19 Claims

An electroless copper plating solution comprising a source of cupric ions, hydroxyl radicals, formaldehyde or a formaldehyde precursor, preferably paraformaldehyde, and a complexing agent for copper; said solution characterized by the addition of a combination of additives comprising an organic silicon compound and a hydrogen inclusion retarding agent and preferably, the combination of the two with at least one member selected from the group consisting of a formaldehyde addition agent and a Group VIII metal salt of the Periodic Chart of the Elements. Copper plate deposited from a solution of this invention is distinguishable from prior art copper deposits by substantially improved bending or tensile properties and a smoother, more highly reflecting appearance. The electroless copper plating solution is capable of providing a rapid rate of copper deposition dependent upon the selection of the complexing agent and the stability of its chelate with copper without sacrifice in tensile or bending properties of the copper deposit.

3,615,734

BRAZEABLE COMPOSITIONS

George Rolland Cole, Wilmington, Del., assignor to E. I. du Pont De Nemours and Company, Wilmington, Del.

Filed Nov. 1, 1968, Ser. No. 772,853
Int. Cl. C09d *5/24*

U.S. Cl. 106—1 6 Claims

The brazeable compositions for metallizing ceramic bodies comprising noble metals and a low-alkali aluminosilicate glass, wherein said glass consists essentially of SiO_2, Al_2O_3, MgO, CaO and Na_2O. Optional amounts of BaO, B_2O_3 and K_2O may also be included in the glass compositions. Critical proportionate amounts of metal: glass and the various oxides are required. These brazeable metallizing compositions can

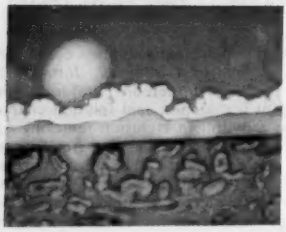
be fired in air, at temperatures of at least 900° C. and yet be brazeable without the need for electroplating; the fired brating compositions are able to withstand reducing atmospheres of a brazing furnace and also compatible with conventional brazing alloys (e.g., Ag-Cu).

3,615,735

ELECTROLESS COPPER PLATING

Charles R. Shipley, Jr., Newton; Lucia Shipley, Newton; Michael Gulla, Newton, and Oleh B. Dutkewych, Medfield, all of Mass., assignors to Shipley Company, Inc., Newton, Mass.

Filed Aug. 13, 1968, Ser. No. 752,250
Int. Cl. C23c *3/02*
U.S. Cl. 106—1 **18 Claims**



An electroless copper-plating solution comprising a source of cupric ions, hydroxyl radicals, formaldehyde or a formaldehyde precursor preferably paraformaldehyde and a complexing agent for copper; said solution characterized by the addition of a member selected from the group consisting of a formaldehyde addition agent, a solution soluble salt of a Group VIII metal of the Periodic Chart of the elements, preferably a combination thereof and most preferably, the two in combination with an organic silicon compound. The copper plate deposited from the preferred solution is alloyed with the Group VIII metal cation and is distinguishable from prior art electroless copper deposits by substantially improved bending or tensile properties and a smoother, more highly reflecting surface appearance. The electroless copper-plating solution is capable of providing a rapid rate of copper deposition dependent upon the selection of the complexing agent and the stability of its chelate with copper without sacrifice in tensile or bending properties of the copper deposit.

3,615,736

ELECTROLESS COPPER PLATING BATH

Frank E. Stone, Trumbull, Conn., assignor to Enthone, Incorporated, New Haven, Conn.

Filed Jan. 6, 1969, Ser. No. 789,402
Int. Cl. B44d *1/092;* **C23c** *3/02*
U.S. Cl. 106—1 **23 Claims**

High stability electroless copper plating baths containing as a stabilizer a small amount of o-phenanthroline and of iodide ions.

3,615,737

ELECTROLESS COPPER DEPOSITION

Frederick W. Schneble, Jr., Oyster Bay, L.I.; John F. McCormack, Roslyn Heights; Rudolph J. Zeblisky, Hauppauge, and John D. Williamson, Miller Place, all of N.Y., assignors to Photocircuits Corporation, Glen Cove, N.Y., by said Schneble, McCormack and Zeblisky

Continuation-in-part of application Ser. No. 768,953, Sept. 23, 1968, Continuation of application Ser. No. 523,863, Feb. 1, 1966, now abandoned. This application Aug. 4, 1969, Ser. No. 847,422
Int. Cl. C23c *3/02*
U.S. Cl. 106—1 **11 Claims**

An improved electroless metal deposition solution is provided which comprises, in combination: an ion of a metal whose electroless metal deposition is desired; a complexing agent for said ion; a reducing agent for said ion; a pH regulator; and a small effective amount of an extraneous ion which has a potential dependent capacity for inner double layer absorption at a surface in contact with the solution on which said metal is electrolessly depositing. In addition, improved methods for electrolessly depositing metal, as well as enhancing the ductility of electroless metal deposits are provided.

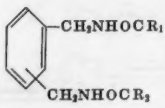
3,615,738

WATER REPELLENT

Takashi Hirose; Yoshitsugu Sakai, and Minoru Takabayashi, all of Aichi, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo and Tokai Seiyu Industrial Co., Ltd., Nagoya, Aichi, Japan

Filed June 5, 1968, Ser. No. 734,568
Claims priority, application Japan, June 5, 1967, 42/35436; Feb. 23, 1968, 43/11056
Int. Cl. C09k *3/18*
U.S. Cl. 106—2 **6 Claims**

A water repellent containing as its active ingredient a compound represented by the general formula



wherein R_1 and R_2 are each selected from the group consisting of alkyl and alkenyl groups having from seven to 21 carbon atoms. One substituent is in either the meta or the paraposition with respect to each other. A process for imparting water repellent properties to a fiber is also disclosed which comprises applying the repellent material to the fiber, drying and heat treating the fiber.

3,615,739

FLOOR POLISHING COMPOSITION CONTAINING SUBSTITUTED -TRIAZINES

Denis Varsanyi, Arlesheim, Baselland, and Willy Roth, Strengelbach, Aargau, both of Switzerland, assignors to Geigy Chemical Corporation, Ardsley, N.Y.

Continuation-in-part of application Ser. No. 672,702, , now abandoned , which is a continuation-in-part of application Ser. No. 421,693, Dec. 28, 1964, now Patent No. 3,374,235, and a continuation-in-part of 560,855, June 27, 1966, now abandoned , and a continuation of 645,467, June 12, 1967, now Patent No. 3,410,855. This application July 30, 1969, Ser. No. 846,272
Int. Cl. C08h *9/06;* **C09f** *; C09g 1/08*
U.S. Cl. 106—10 **15 Claims**

Surface treating agents containing as waxy, gloss-imparting component a trisamino-s-triazine derivative in which one of the three amino groups is substituted by a radical -Q-Y in which Q is an alkylene or alkenylene radical and Y represents certain hydrophilic substituents.

3,615,740

CHROMATE CONVERSION COATING COMPOSITIONS CONTAINING PRUSSIDE ACCELERATOR

Kurt Goltz, Exton, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Feb. 2, 1970, Ser. No. 7,992
Int. Cl. C09d *5/08*
U.S. Cl. 106—14 **9 Claims**

A composition for applying a chromate conversion coating on aluminum comprised of hexavalent chromium, fluoride, and a prusside as an accelerator selected from the group consisting of $Na_2[Fe(CN)_5NH_3]$; $Na_3[Fe(CN)_5NH_3]$; $Na_3[Fe(CN)5H_2O]$; $Na_4[Fe(CN)_5H_2O)]$ and $Na_3[Fe(CN)_5NO_2]$

3,615,741

CHROMIUM-CONTAINING COMPONENT FOR SURFACE COATINGS, PROCESS FOR MAKING SAME AND SURFACE COATING COMPOSITIONS CONTAINING SAME

Allan Boy Earl Gilchrist, Westlake, Ohio, assignor to SCM Corporation, Cleveland, Ohio

Continuation-in-part of application Ser. No. 638,627, May 15, 1967, now abandoned. This application Apr. 9, 1969, Ser. No. 814,852

Int. Cl. C09d *5/08*

U.S. Cl. 106—14 **12 Claims**

This patent application sets forth a chromium-containing component for surface coatings, the preformed reaction product of an oleophilic, hydrophobic organic acid of low volatility and hydrated chromic oxide in the proportion of about 2–50 grams of CrO_3 per each gram equivalent of acid group present in the organic acid, process for making same including the essential arresting of thickening of the reaction product short of a friable gel stage with a base, surface coating compositions incorporating the component, and concentrate compositions incorporating the component, which concentrate compositions are particularly useful in compounding water-dispersed surface coatings.

3,615,742

PROCESS FOR PREPARING FIRE RETARDANT COMPOSITION

Albert L. Smith, Middleport, Ohio, assignor to Stauffer Chemical Company, New York, N.Y.

Continuation-in-part of application Ser. No. 679,542, Oct. 31, 1967, now abandoned. This application Apr. 13, 1970, Ser. No. 27,979

Int. Cl. C09d *5/18;* **C09k** *3/28*

U.S. Cl. 106—15 **3 Claims**

A process is disclosed for adjusting the viscosity of tris-dichloropropyl phosphate by admixing it with between about 5 and 30 percent, by weight, of a chlorinated naphthalene. The resulting formulation may then be conveniently employed as a fire-proofing composition, particularly for spinning baths for synthetic fibers.

3,615,743

SELF-EXTINGUISHING COMPOSITIONS

William John Theuer, Chatham, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Apr. 10, 1968, Ser. No. 720,323

Int. Cl. C08b *21/04*

U.S. Cl. 106—15 **11 Claims**

The self-extinguishing properties of cellulose esters are improved without causing an acceleration in light fading of dyes present in the cellulose ester by the incorporation of minor amounts of secondary alkyl phosphates having terminally positioned halogen groups.

3,615,744

ANTIFOULING PAINTS

Makoto Yokoo, Toyonaka; Junji Ogura, Minoo, and Hiroshi Ikeda, Takatsuki, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed July 3, 1968, Ser. No. 742,187

Claims priority, application Japan, July 3, 1967, 42/42665

Int. Cl. C09d *5/14*

U.S. Cl. 106—15 **7 Claims**

An antifouling paint, useful interalia in preventing marine growth on ship bottoms, hulls, nets, piles, etc., contains a synergistic combination of 2-amino-3-chloro-1,4-naphthoquinone, a copper compound (e.g. a basic copper sulfate) and an organic tin compound (tributyl tin fumarate, tributyl tin fluoride) in a suitable vehicle.

3,615,745

ANTIMICROBIAL COATINGS AND METHOD USING DIIODOMETHYL SULFONES

Aldo J. Crovetti, Lake Forest; Donald S. Kenney, Northbrook, Village, and Richard B. Hasbrouck, Lake Forest, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Mar. 10, 1969, Ser. No. 805,877

Int. Cl. A01n *9/12, 21/00;* **C07c** *147/08;* **C08f** *45/64*

U.S. Cl. 106—15 **24 Claims**

Application of a coating composition comprising halomethyl sulfones protects agricultural and industrial substrates against fungicidal and bacterial attack. Use of diiodomethyl sulfones is especially effective to protect latex paint films, textiles, seeds and growing crops.

3,615,746

FLAME-RETARDANT CELLULOSE TRIACETATE ARTICLES

Willard C. Brinegar, Charlotte, N.C., and Joseph Di Pietro, Alma, Mich., assignors to Celanese Corporation, New York, N.Y.

Continuation-in-part of application Ser. No. 562,119, July 1, 1966, now abandoned. This application Dec. 10, 1969, Ser. No. 883,997

Int. Cl. C08b *21/04*

U.S. Cl. 106—15 **16 Claims**

A composition and solution for forming shaped articles comprising cellulose acetate, from 1 to 20 percent of a bromo-aliphatic phosphate containing from 10 to 30 percent bromine and from 0.4 to 3 percent of a second compound selected from the group consisting of phenyl phosphates, cresyl phosphates, di(t-butyl) peroxide, dicumyl peroxide, and 2,5-dimethyl-2,5-di(t-butyl-5-peroxy) hexane.

3,615,747

COLD GUN BLUE IN SOLID OR SEMISOLID STATE

Harry Friedman, 41-16 Union St., Fairlawn, N.J.

Continuation-in-part of application Ser. No. 447,064, Apr. 9, 1965, now abandoned. This application June 21, 1968, Ser. No. 740,444

Int. Cl. C09d *11/00, 13/00*

U.S. Cl. 106—19 **7 Claims**

A gun blue composition in the form of a gel suitable for use at room temperatures, and a method of blueing using the composition of the invention.

3,615,748

PROCESS FOR PREPARING QUICK DRYING, PLASTICIZED SULFUR ROAD COMPOSITIONS

Lawrence A. Smalheiser, Spring Valley, N.Y., assignor to Stauffer Chemical Company, New York, N.Y.

Filed Dec. 5, 1968, Ser. No. 781,580

Int. Cl. C09d *11/00, 13/00*

U.S. Cl. 106—19 **12 Claims**

Process for preparing sulfur marking compositions comprising from about 50 percent to about 95 percent elemental sulfur, from about 1 percent to about 20 percent sulfur containing plasticizer and from about 0 percent to about 30 percent filler, comprising reacting said ingredients in the presence of a basic catalyst, the improvement which comprises incorporating in said reaction mixture a minor amount of a nitrogen containing compound as drying agent selected from mercaptobenzothiazoles, mercaptoalkylthiazoles, dithiocarbamates, bis(thiocarbamoyl) sulfides, guanidines and aldehyde-amine reaction products.

3,615,749

PRINTING INK OF IMPROVED BLACKNESS

John Henry Cramer, and Walter Eldon Ness, both of Marietta, Ohio, assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of application Ser. No. 650,639, July 3, 1967, now Patent No. 3,523,811, dated Aug. 11, 1970. This application June 19, 1970, Ser. No. 047,874

Int. Cl. C09d *11/00, 11/02, 11/16*

U.S. Cl. 106—20 1 Claim

Carbon black ink compositions of improved blackness result from treating a ferric ammonium ferrocyanide pigment, (iron blue) preferably while still in aqueous dispersion, with a cationic surfactant of the asphalt antistripping type, such as an alkylamidoalkylhydroxyalkyl quaternary ammonium compound, such as stearamidopropyl dimethyl-2-hydroxyethyl ammonium nitrate, and incorporating in the ink to prevent browning.

3,615,750

PLANOGRAPHIC PRINTING INKS AND PROCESS FOR MAKING AND USING SAME

Rush V. Blair, 103 W. 4th St., Peoria, Ill.

Filed June 16, 1970, Ser. No. 46,833

Int. Cl. C09d *11/06*

U.S. Cl. 106—27 17 Claims

Planographic and lithographic printing inks comprising a substantially anhydrous polyhydric alcohol-in-oil emulsion are disclosed. These emulsoid inks may be used in planographic or lithographic printing processes and eliminate the necessity of separate and repeated dampening of the plate between copies.

3,615,751

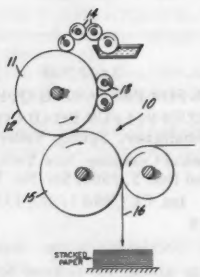
PROCESS AND COMPOSITION FOR PREVENTING OFFSETTING OF DRYING PRINTING INK

Manuel J. Lecha, and Jose S. Mascaro, both of Barcelona, Spain, assignors to Salvat Editores, S.A., Barcelona, Spain

Continuation-in-part of application Ser. No. 722,058, Apr. 17, 1968, now abandoned. This application Dec. 11, 1968, Ser. No. 782,997

Int. Cl. C09d *11/14*

U.S. Cl. 106—25 10 Claims



A process and composition of matter for preventing undried ink on printed sheets of paper from offsetting or imprinting onto adjacent sheets, for example in a printing process employing a high-speed offset press, including the steps of forming a printing ink additive containing starch particles uniformly dispersed in a nonaqueous medium compatible with the printing ink, mixing the ink additive with the printing ink, contacting the starch-containing printing ink with water, and printing the ink on sheets of paper which are then stacked.

3,615,752

PRINTING INK

Jake Walter Hoffman, Jr., Cincinnati, Ohio, and Gregory Joseph Huelsman, Wychoff, N.J., assignors to Borden, Inc., New York, N.Y.

Continuation-in-part of application Ser. No. 671,486, Sept. 28, 1967, now abandoned , which is a continuation of application Ser. No. 520,077, Jan. 12, 1966, now abandoned. This application Sept. 10, 1969, Ser. No. 856,817

Int. Cl. C09d *11/06*

U.S. Cl. 106—27 3 Claims

This invention relates to printing inks for use on coarse or other paper or liquid-permeable base material comprising a coloring agent and a varnish, said varnish having a PH below 7 consisting essentially of a solution in 20–100 parts by weight of a glycol solvent of (a) 100 parts by weight of acid resin plus up to 30 parts by weight of an adduct-forming acid for every 100 parts of base resin and having an acid number of at least 60 and (b) the water-soluble salt formed by reaction of the acidic resin with between about 1 to 6 parts by weight of a monomeric, water-soluble, volatile amine, the amount of amine used being equivalent to no more than 75 percent of the acidity of the resin, said solution in said solvent of said resin, amine and salt being substantially free from amide.

3,615,753

METHOD FOR MANUFACTURING FOUNDRY MOLDS

Freddy Jean Heinrichs, Embourg, and Roland Louis Pattyn, Liege, both of Belgium, assignors to Fonderies Magotteaux, societe anonyme, Vaux-sous-Chevremont, Belgium

Filed May 20, 1970, Ser. No. 39,144

Claims priority, application Belgium, May 21, 1969, 42,280

Int. Cl. B28b *7/34*

U.S. Cl. 106—38.3 6 Claims

Foundry sand is produced with a binder of swellable clay and greatly increased cohesion, by mixing the binder with more than twice the desired amount of water and then reducing this amount of water to at least the level at the time of forming the sand mold. The water can also be reduced to substantial dryness. The initial proportion of water should be two to 20 times the working proportion. The clay can for example be bentonite.

3,615,754

PREPARATION OF NONBLEEDING INK COMPOSITIONS

William W. Gotshall, 3081 Walma Drive, Orchard Lake, Mich.

Filed Dec. 23, 1968, Ser. No. 786,386

Int. Cl. C09d *11/08, 11/00*

U.S. Cl. 106—30 7 Claims

Nonbleeding ink compositions are prepared comprising a liquid vehicle in which 2 percent to about 10 percent by weight of a carbonaceous material having a benzene discoloration test of not less than about 98 percent is suspended. The carbonaceous particles are produced by coking a petroleum fraction, then calcining the petroleum coke to a volatile combustible hydrocarbon content of less than about 3 percent by weight based on the weight of the coke, then comminuting the resulting product to a particle size of 100 percent less than 2.5 microns and at least 50 percent less than 1.5 microns.

The carbon particles are dispersed in a liquid vehicle or varnish comprised of a highly paraffinic oil having a viscosity of from 5 to 10 centipoise at 60° F. in amounts of 2 percent to about 10 percent by weight based on the total weight of the coke and the vehicle. The ink pigment prepared in accordance with the invention preferably has a Cabot Nigrometer rating of from about 80 to about 100.

3,615,755

METHOD FOR MAKING A MOLD USING MANGANESE CARBONATE

Yashimitsu Uto; Daizo Yamasaki; Teisiro Watanabe, and Kouji Matsuoka, all of Hiroshima-shi, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of application Ser. No. 673,306, Oct. 6, 1967, now abandoned. This application Jan. 14, 1970, Ser. No. 2,930

Int. Cl. B28b 7/34

U.S. Cl. 106—38.3 9 Claims

A method of making a mold or the like comprising the steps of mixing an alkali silicate as a binder with molding sand and adding manganese carbonate to the mixture of molding sand and alkali silicate as a self-hardener, and forming the mixture into a mold. Additionally, the mixture may be fluidized by adding a surface-active agent and also water may be added to assist in the fluidizing operation.

A composition of material for forming a mold is comprised of a mixture of molding sand, such as silica sand, olivine sand, zircon sand, and the like, an alkali silicate, such as sodium silicate, used as a binder, and powdered manganese carbonate is employed as a self-hardener. If a fluidized mixture is desired a surface-active agent, such as sodium salt of N-lauryl amino propionic acid and water may be added to the sand mixture.

3,615,756

TRANSPARENT THORIA-BASE CERAMICS AND METHOD FOR PRODUCING SAME

Paul J. Jorgensen, Scotia, N.Y., assignor to General Electric Company

Filed July 3, 1967, Ser. No. 650,793

Int. Cl. C04b 33/00

U.S. Cl. 106—39 4 Claims

The preparation of high-density thoria-base ceramic bodies containing up to 8 mole percent of CaO is disclosed. These bodies have high orders of in-line transmission of light between about 0.3 and 10.0 microns and are prepared by pressing the mixed powders and sintering in a hydrogen-water vapor atmosphere until theoretical density is achieved.

3,615,757

HIGH DIELECTRIC CONSTANT NIOBATE-TITANATE GLASS-CERAMIC ARTICLES

Andrew Herczog, Painted Post, and Margaret M. Layton, Big Flats, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed May 31, 1968, Ser. No. 733,293

Int. Cl. C04b 33/00

U.S. Cl. 106—39 DY 4 Claims

This invention relates to the manufacture of glass-ceramic materials which are especially well suited for the production of high-performance capacitors. These materials are transparent, are essentially free from Na_2O, and contain crystals preferably of alkaline earth niobates or titanates, varying in size between about 100–2,000 A.

3,615,758

DEVITRIFIABLE GLASSES AND TO GLASS-CERAMICS

Peter William McMillan; Brian Purdam Hodgson, and Douglas Stanley Crozier, all of Stafford, England, assignors to The English Electric Company, Limited, London, England

Filed June 12, 1968, Ser. No. 736,291

Claims priority, application Great Britain, June 22, 1967, 28,788/67

Int. Cl. C03c 3/22, 3/00, 3/04

U.S. Cl. 106—39 DV 10 Claims

Devitrifiable glasses and refractory glass-ceramics, especially suitable for use as insulating coatings on thin wires, contain P_2O_5 together with ZnO or BaO or both. MgO may be present if ZnO is present and a nucleating agent is included.

3,615,759

SILICA-ALUMINA-LITHIA GLASSES, CERAMICS AND METHOD

Robert A. Busdiecker, Woodville, and James E. Rapp, Oregon, both of Ohio, assignors to Owens-Illinois, Inc.

Continuation of application Ser. No. 574,927, Aug. 25, 1966, now abandoned, Continuation-in-part of application Ser. No. 518,447, Jan. 13, 1966, now Patent No. 3,507,737, Continuation-in-part of application Ser. No. 522,020, Jan. 21, 1966, now abandoned. This application June 2, 1969, Ser. No. 833,865

Int. Cl. C04b 33/00

U.S. Cl. 106—39 DV 18 Claims

Disclosed are new thermally crystallizable glasses in the silica-alumina-lithia system containing titanium oxide, zirconium oxide, and calcium oxide and being limited to very low percentages of ZnO, P_2O_5 and B_2O_3. Glass-ceramics of these same compositions and methods for making them by crystallizing such glasses are also disclosed, as are transparent glass-ceramic mirror blanks of low coefficients of expansion.

3,615,760

CALCIUM OXIDE-ALUMINUM OXIDE-SILICON DIOXIDE CERAMIC SUBSTRATE MATERIAL FOR THIN FILM CIRCUITS

John C. Williams, Whippany, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 14, 1969, Ser. No. 815,655

Int. Cl. C04b 33/00

U.S. Cl. 106—39 R 3 Claims

A ceramic body, having the nominal composition in percent by weight 31 CaO, 56 Al_2O_3 and 13 SiO_2, when fired to a dense, fine-grain structure, is useful as a substrate material for thin film resistors and capacitors.

3,615,761

PHOTOTROPIC ARTICLES CONTAINING THALLOUS HALIDE

Sumio Sakka, Troy, and John D. MacKenzie, Schenectady, both of N.Y., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 31, 1968, Ser. No. 701,974

Int. Cl. C03c 3/16, 3/26, 3/22

U.S. Cl. 106—47 R 2 Claims

This invention relates to phototropic articles containing thallous halides. It particularly relates to thallous halide containing glasses and glass-ceramics, particularly glasses and glass-ceramics containing thallous halides which have been doped with a metal such as copper or indium.

3,615,762

THORIUM-FREE, LANTHANUM BORATE OPTICAL GLASS

Richard John Parry, Southport; Reginald Dunning, Parbold; Albert Forber, Upholland, and George Albert Higham, Wigan, all of England, assignors to Pilkington Brothers Limited, Liverpool, England

Filed June 27, 1968, Ser. No. 740,462

Claims priority, application Great Britain, July 26, 1967, 34419/67

Int. Cl. C03c 3/00

U.S. Cl. 106—47 Q 3 Claims

Thorium-free optical glass having increased resistance to acids and improved devitrification characteristics, and containing by weight as essential ingredients from 37 to 45% B_2O_3, from 45 to 53% La_2O_3, and from 0.5 to 4.5% Al_2O_3.

3,615,763

HIGH-ALUMINA CERAMIC BODY AND METHOD OF MAKING SAME

William M. Flock, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed June 4, 1969, Ser. No. 830,413
Int. Cl. C04b *33/26*
U.S. Cl. 106—46 6 Claims

This invention relates to sintered ceramic articles of the type usable as electrical insulators in an environment under which , body is subjected to wide ranges of temperature variation while meeting high-strength requirements and of the type also usable in other applications requiring high-strength and a high resistance to thermal shock such as the turbine and nuclear reactor parts; such a body consisting essentially of a reaction product which, calculated as oxides, approximates 94–96.5 weight percent Al_2O_3 and a mixture of SiO_2, CaO, and MgO which mixture falls within a parallelogram-shaped area on a weight percent triaxial diagram approximately bounded by the compositions represented as follows:

	A	B	C	D
SiO_2	60%	46%	46%	60%
CaO	32%	39%	44%	37%
MgO	8%	15%	10%	3%

3,615,764

ARSENIC PENTOXIDE GLASS COMPOSITIONS

Georg Krolla, Mainz-Mombach, Germany, assignor to JENAer Glaswerk Schott S. Gen., Mainz, Germany

Filed Mar. 24, 1969, Ser. No. 809,507
Claims priority, application Germany, Mar. 30, 1968, P 17 71 080.4
Int. Cl. C03c *3/00, 3/12, 3/18*
U.S. Cl. 106—47 Q 25 Claims

Optical glass compositions comprising 8 to 60 percent by weight arsenic pentoxide and 40 to 92 percent by weight simple and/or complex inorganic fluorides.

3,615,765

GLAZE FOR CERAMIC PARTS AND ARTICLES

Vera Ivanovna Bystrova, Petrosky pereulok, 3, kv. 60; Natalia Lavrentievna Polyakova, Stredne-Okhtinsky prospekt 12, kv. 15, and Galina Arkhipovna Mikhailova, Liteiny prospekt 46, kv. 13, all of Leningrad, U.S.S.R.

Filed Oct. 3, 1968, Ser. No. 764,962
Int. Cl. C03c *3/04;* C04b *33/00;* C03c *5/02*
U.S. Cl. 106—48 2 Claims

A glaze is proposed which retains its strength and high dielectric properties during the process of metallization of ceramic parts and articles. The glaze contains by weight about 57–65 percent SiO_2, 20–27 percent Al_2O_3, 5–6.6 percent MgO, 9–12 percent K_2O+Na_2O, and 0.5–1.5 percent CaO.

3,615,766

LANTHANUM BORATE FIBER-OPTIC GLASS

Gertraud Agnes Anna Piesslinger, and Hubertus Mathieu Johannes Josephus Kunnen, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 18, 1969, Ser. No. 834,495
Claims priority, application Netherlands, June 29, 1968, 6809259, 6905000, Apr. 1, 1969
Int. Cl. C03c *3/00, 13/00*
U.S. Cl. 106—50 3 Claims

Glass having a high refractive index which is used as core glass of glass fibers present in a bundled form in a fiber-optic element. This glass has a composition in percent by weight between the following limits:

B_2O_3	19–22
La_2O_3	34–38
Al_2O_3	2– 5
ZrO_2	6– 9
Nb_2O_5	8–15
Ta_2O_5	4–12
ThO_2	8–20
BaO	≤6
TiO_2	≤3

3,615,767

GLASS MANUFACTURE EMPLOYING SODIUM SULFITE

Alfred R. Conroy, Jr., Denver; William C. Bauer, Boulder, and David D. Billings, Golden, all of Colo., assignors to FMC Corporation, New York, N.Y.

Continuation of application Ser. No. 542,714, Apr. 13, 1966, now abandoned. This application Jan. 20, 1970, Ser. No. 4,440
Int. Cl. C03c *3/04*
U.S. Cl. 106—52 4 Claims

Process of melting a glass batch in order to reduce the number and size of seeds which are present in the final glass product by adding a minor but effective amount, on the order of 0.015 to 1.8 percent by weight, of sodium sulfite to the glass batch charged to a glass furnace.

3,615,768

DRY REDISPERSIBLE SATIN WHITE AND METHOD OF PREPARING

Milton E. Winyall, Ellicott City, Md., Thomas E. McGoury, Severna Park, Md., and Julian H. Chaudet, Fairfax, Va. assignors to W. R. Grace & Co., New York, N.Y., a corporation of Connecticut

Filed Apr. 14, 1969, Ser. No. 816,033
Int. Cl. C09c *1/02*
U.S. Cl. 106—306 8 Claims

Drying methods of producing a dried form of satin white which is easily redispersible in liquid carriers, are disclosed. In one aspect themethods are characterized by spray drying under specific temperature conditions. Satin white has utility as a pigment for both paints and paper coatings.

3,615,769

LANTHANUM BOROSILICATE OPTICAL GLASS

Ernst Leitz, Wetzlar/Lahn; Heinz Bromer, Herrmamstein, am Hendsruck, and Norbert Meinert, Wetzlar/Lahn, all of Germany, assignors to Ernst Leitz, GmbH, Wetzlar/Lahn, Germany

Continuation-in-part of application Ser. No. 829,033, May 29, 1969, now Patent No. 3,563,773, which is a continuation-in-part of application Ser. No. 563,867, July 8, 1966, now abandoned , which is a division of application Ser. No. 786,726, Jan. 14, 1959, now abandoned. This application Mar. 9, 1970, Ser. No. 17,424
Int. Cl. C03c *3/04*
U.S. Cl. 106—54 5 Claims

An optical glass is disclosed which consists essentially of (a) a glass base consisting of B_{23}, SiO_2 and La_2O_3, (b) of ZrO_2

and Ta_2O_5 or Nb_2O_5 and (c) of at least one constituent selected from a group including the oxides of such metals as magnesium, calcium, zinc, cadmium, aluminum, and tungsten. The index of refraction of the invented glass ranges in dependence on the percentage of the individual components from 1.80 to 1.83 while the Abbe numbers are between 43 and 45.

3,615,770

GLASS HAVING A LOW ULTRASONIC PROPAGATION TIME TEMPERATURE COEFFICIENT

Marga Faulstich, and Norbert Neuroth, both of Mainz, Momback, Germany, assignors to JENAer Glaswerk, Mainz, Germany

Filed Dec. 1, 1967, Ser. No. 687,099

Claims priority, application Germany, Dec. 7, 1966, J 32423

Int. Cl. C03c *3/04*

U.S. Cl. 106—53 **9 Claims**

A glass having a low ultrasonic wave propagation time temperature coefficient, preferably for transverse waves of about 4 MHz. is disclosed having the following composition in weight percent:

$SiO_2 + B_2O_3$	65–83
(B_2O_3)	0– 3
Alkali oxides	9–20
TiO_2	2– 6
$TiO_2 + PbO$	5–22
As_2O_3 and/or Sb_2O_3	0.3–1.5

The glass is particularly adapted for use as a delay line, i.e., a means to retard the propagation of signal between two points.

3,615,771

PHOTOCHROMIC GLASS

Gerald S. Meiling, Medford, Mass., assignor to Corning Glass Works, New York, N.Y.

Filed Sept. 23, 1968, Ser. No. 761,802

Int. Cl. C03c *3/04*

U.S. Cl. 106—54 **3 Claims**

This invention relates to the production of photochromic glasses having compositions within the CdO B_2O_3 SiO_2 field.

3,615,772

FLUORINE-CONTAINING BORATE GLASS COMPOSITIONS

Jaroslaw Kohut, Parma Heights, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Apr. 25, 1969, Ser. No. 819,473

Int. Cl. C03c *3/04*

U.S. Cl. 106—54 **6 Claims**

There is disclosed fluorine-containing glass compositions which are lead-free and which have utility as sealing glasses, especially for iron-sealing applications, and which are useful as a frit. The glasses generally have the following compositions in percent by weight: about 5–11 percent SiO_2; about 37–53 percent B_2O_3; about 5–12 percent ZnO; about 2–5 percent Al_2O_3; about 4–18 percent Na_2O; about 2–6 percent K_2O; about 2–13 percent Li_2O; about 3–6 percent CaO; about 3–6 percent BaO; and fluorine in an amount not to exceed about 3.5 percent.

3,615,773

GLASS FOR MANUFACTURE OF GLASS-COATED MICROWIRE

Serafima Petrovna Obidina, Gogolevsky bulvar, 25, kv. 13, and Alexandra Nikolaevna Bush, Zelenograd, Korpus 352, kv. 51, both of Moscow, U.S.S.R.

Filed Sept. 12, 1969, Ser. No. 857,578

Int. Cl. C03c *3/08;* **C32b** *3/08*

U.S. Cl. 106—54 **1 Claim**

Glass for manufacturing by the casting technique glass-coated, continuous filament microwire from metals and alloys having a melting point above 1,450° C., for example, from nickel, palladium, nichrome, etc., which contains, apart from SiO_2, B_2O_3, BaO, K_2O and Li_2O, also P_2O_5 present to the extent of 0.5–0.7 percent by weight of all the glass components.

3,615,774

PHOSPHATE-BONDED MONOLITHIC REFRACTORY BATCH

George H. Criss, Bethel Park, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 8, 1968, Ser. No. 696,157

Int. Cl. C04b *35/04, 35/10, 35/48*

U.S. Cl. 106—57 **8 Claims**

A refractory monolithic refractory batch comprising refractory aggregates reactive with phosphoric acid and phosphoric acid absorbed in exfoliated vermiculite.

3,615,775

HIGH ALUMINA REFRACTORY COMPOSITION

Frederick J. Teeter, Pittsburgh, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed June 10, 1970, Ser. No. 45,221

Int. Cl. C04b *35/10*

U.S. Cl. 106—59 **5 Claims**

Ceramically bonded high alumina refractory comprising Al_2O_3, MgO and Cr_2O_3, the molar ratio of the MgO to Cr_2O_3 between 1:1 and 2.5:1, said refractory microscopically characterized by coarse alumina grains having Cr_2O_3 in solid solution, said alumina grains knitted together by a solid solution of $MgO{\cdot}Al_2O_3{\cdot}Cr_2O_3$ spinel.

3,615,776

UNBURNED BASIC REFRACTORY BRICK AND METHOD OF MAKING SAME

Grant M. Farrington, Marlton, N.J.; Walter S. Treffner, Linthicum Heights, and George D. MacKenzie, Timonium, Md., assignors to General Refractories Company, Philadelphia, Pa.

Filed Apr. 1, 1968, Ser. No. 717,788

Int. Cl. C04b *35/42*

U.S. Cl. 106—59 **12 Claims**

An unburned basic refractory brick composed of a mixture of relatively coarse magnesia particles, relatively coarse chrome-ore particles and from about 15 to about 40 percent of relatively fine aggregates consisting essentially of a prereacted mixture of periclase particles sintered directly to chrome-ore particles.

3,615,777

PHOSPHATE BONDED MAGNESITE-CHROME BRICK

Ben Davies, and George F. Carini, both of Pittsburgh, Pa., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed June 3, 1968, Ser. No. 734,042

Int. Cl. C04b *35/42*

U.S. Cl. 106—59 **7 Claims**

Magnesite-chrome ore brick having a sodium phosphate binder and extremely high tensile strength as a result of the

formation, in service or in burning in a kiln of a calcium sodium silicophosphate bond.

3,615,778
PROCESS FOR THE PREPARATION OF MULLITE BONDED REFRACTORY MATERIALS
Robert E. Albert, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed Mar. 10, 1969, Ser. No. 805,838
Int. Cl. C04b *35/16*
U.S. Cl. 106—65 **4 Claims**

A process for making (1) a mullite binder precursor powder, (2) mullite, and (3) mullite bonded refractory materials is disclosed. The contribution to the art lies in the discovery that mullite can be made by firing a dry mixture of silica and aluminum chlorhydroxide at temperatures ranging from 1,050° C. to 1,300° C.

3,615,779
PROCESS FOR THE PROMOTION OF FLOW OF AQUEOUS INORGANIC SOLIDS DISPERSIONS
Helmut Von Freyhold, Dusseldorf-Oberkassel, Germany, assignor to Henkel & Cie GmbH, Dusseldorf-Holthausen, Germany
Continuation of application Ser. No. 612,098, Jan. 27, 1967, now abandoned. This application Apr. 16, 1970, Ser. No. 28,225
Int. Cl. B01f *17/20, 17/54*
U.S. Cl. 106—74 **6 Claims**

A process for the promotion of the flow of aqueous inorganic solids dispersions using a mixture of at least one alkalisilicate and at least one water-soluble salt of an amino-polyphosphonic acid in proportions ranging from 20:1 to 2:1.

3,615,780
SILICATE-CATALYZED CHEMICAL GROUTING COMPOSITIONS
Young J. Kim, Lake Hiawatha; Charles F. Murphy, Morristown, and Reid L. Mitchell, Morristown, all of N.J., assignors to ITT Rayonier Incorporated, Shelton, Wash.
Filed May 28, 1969, Ser. No. 828,698
Int. Cl. C04b *19/02, 19/04*
U.S. Cl. 106—74 **8 Claims**

A unique chemical grouting composition is provided for injection stabilization of earth, sand and other porous, particulate formations or agglomerates or solids. The composition produces grouted structures of excellent strength and durability and has a wide range of uses in a system comprising sequential formulation and subsequent injection of on-site-formed aqueous solutions of (a) base materials comprising vegetative polyphenolic material derived from coniferous bark or a tannin of the catechin or condensed type and of (b) catalyst mixtures comprising a water soluble alkali metal silicate, formaldehyde or paraformaldehyde, and sufficient acid to establish the catalyst solution pH at 0.5 to 6.0 and preferably 3–5. Optional modification materials such as asphalt, clay, or a hydraulic cement, or fibrous material such as asbestos, may be included.

3,615,781
TWO-POT SILICATE COATINGS COMPOSITIONS
Robert H. Schneider, 3639 Grennoch, Houston, Tex., and John B. Schutt, 2403 Peach Stone Ct. Silver Spring, Md.,
Filed Aug. 6, 1968, Ser. No. 750,457
Int. Cl. C09d *1/04*
U.S. Cl. 106—84 **21 Claims**

High sheen, silicate coatings compositions which demonstrate water-resistance, fire-resistance, abrasion-resistance, and soil-resistance are prepared as a two-container system. An alkali metal silicate solution and a colloidal silica sol are admixed to provide a mixture having an SiO_2:M_2O mole ratio of about 10:1 and which contains more than about 35 percent by weight of silicate and silica at a pH sufficiently high to promote hydration of the silica. The coatings do not possess long shelf life and are applied soon after admixture of the ingredients. Various bulking agents and the like can be added to these coatings. For example, the addition of finely divided mica provides an excellent coating for fireproofing polyurethane foam.

3,615,782
HIGH-TEMPERATURE PAINT MATERIAL
Mohendra S. Bawa, Richardson, and Andrew J. Petty, Mesquite, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed May 1, 1969, Ser. No. 821,062
Int. Cl. C09d *1/02*
U.S. Cl. 106—84 **3 Claims**

A paint base material capable of withstanding temperatures on the order of about 900° C. for protecting metals against chemical attack, having the following composition by weight:

Silica sand	30%
$NaLiCO_3$	45%
Cr_2O_3	7.5%
Fe_2O_3	5%
Graphite	12.5%

The base material can be mixed with alkali metal silicates, for example, sodium and potassium silicate, to provide a paint composition adaptable for easy application.

3,615,783
HYDRAULIC CEMENT COMPOSITIONS
John Wilfred Howard, 164 North Shore Boulevard East, Burlington, Ontario, Canada
Continuation-in-part of application Ser. No. 629,420, Apr. 10, 1967, now abandoned. This application June 24, 1970, Ser. No. 49,527
Int. Cl. C04b *5/00, 7/14*
U.S. Cl. 106—89 **10 Claims**

A hydraulic cement composition comprising a uniform, finely divided mixture of a Portland cement and mineral wool shot slag, the proportion of slag being from about 10 to 90 percent by weight of the mixture.

3,615,784
COMPOSITIONS FOR PRODUCING IMPROVED CONCRETE
James R. Cattanach, Province of British Columbia, Canada, assignor to John Godfrey; Charles Hall; Alexander Bruce Robertson and Charles Reginald Tanner, all of Vancouver, BC, Canada, part interest to each
Continuation-in-part of application Ser. No. 583,959, Oct. 3, 1966, now abandoned. This application Aug. 4, 1969, Ser. No. 847,438
Int. Cl. C04b *7/02*
U.S. Cl. 106—88 **11 Claims**

A composition for producing air-entrained concrete which includes hydrolyzed casein, water, and a polyethenoxy type surface active agent. Polyvinyl alcohol also can be added to mixture. These compositions in foamed or unfoamed form are mixed with hydraulic cement and water to produce air-entrained concrete or concrete with normal amounts of air.

3,615,785
CEMENT GRINDING AID AND PACK SET INHIBITOR
Howard H. Moorer, Charleston, and Charles M. Anderegg, Sullivan's Island, both of S.C., assignors to West Virginia Pulp and Paper Company, New York, N.Y.
Filed Feb. 2, 1968, Ser. No. 702,519
Int. Cl. C04b *13/26*
U.S. Cl. 106—90 **12 Claims**

Additive compositions for use as grinding aids and pack set inhibitors in the manufacture of hydraulic cement composed

of a water-soluble polyol, particularly a glycol, and a water-soluble salt of an aliphatic acid having no more than three carbons, said additive compositions being used either alone or in combination with water-soluble salts of a sulfonated lignin, a water-soluble hydroxyalkyl amine and urea, the hydraulic cement product of this addition and the method for making the cement product.

3,615,786

SIMULTANEOUSLY OXIDIZING STARCH WITH A HYPOHALITE AND AIR

Jerry A. Moskaluk, Midlothian, Ill., assignor to CPC International Inc.

Continuation of application Ser. No. 705,638, Feb. 15, 1968. This application Feb. 16, 1970, Ser. No. 10,086

Int. Cl. C08b *25/02*

U.S. Cl. 106—210 **6 Claims**

Covers a method of oxidizing starch. Particularly covers a method of oxidizing starch by first forming a basic aqueous slurry of starch, and then oxidizing said starch in slurry form by treatment with dual oxidants comprising an alkali metal hypohalite, such as sodium hypochlorite, and a source of oxygen. In a preferred embodiment the oxidation is carried out by addition of an alkali metal hypohalite, such as sodium hypochlorite to the starch slurry and by bubbling in air through the alkali metal hypohalite-treated starch slurry during the oxidation reaction. The oxidized granular starch product can be recovered in dry form and is particularly useful as a binder in a paper-coating composition.

3,615,787

METHOD OF THE PRODUCTION OF SUPERHIGH EARLY STRENGTH CEMENTS

Hideo Teramoto, and Tatsuo Kasakawa, both of Tokyo, Japan, assignors to Nihon Cement Co., Ltd., Tokyo, Japan

Filed Dec. 9, 1969, Ser. No. 883,608

Claims priority, application Japan, Aug. 28, 1969, 44/67615

Int. Cl. C04b *7/48, 7/52*

U.S. Cl. 106—102 **1 Claim**

Method of the production of superhigh early strength cements which comprises using, in addition to the materials such as limestone, clay and pyrite cinder generally used as the raw materials for portland cements, a raw material containing as the major or minor component a chromium compound such as chromite and a raw material containing as the major or minor component a fluoride such as fluorite, in the preparation of raw mixtures which are obtained either by mixing crushed or ground said raw materials or by further grinding the raw mixtures, mixing said raw materials in such a ratio as to provide contents of tricalcium silicate ($3CaO \cdot SiO_2$), tricalcium aluminate ($3CaO \cdot Al_2O_3$) chromium oxide (Cr_2O_3) and fluorine (F) in clinkers which are obtained by sintering said raw mixtures within the ranges set forth in the table

Compound or element	*Scope of content (%)*
Tricalcium silicate ($3CaO \cdot SiO_2$)	65 to 85
Tricalcium aluminate ($3CaO \cdot Al_2O_3$)	7 to 13
Chromium oxide (Cr_2O_3)	0.3 to 1.5
Fluorine (F)	0.2 to 1.0,

in the preparation of cements by crushing mixtures of said clinkers and gypsums, adding to said clinkers such amounts of gypsum that contents of sulfuric anhydride (SO_3) in said cements are within a range between 1.5 and 4.5 percent and grinding the resulting cements to produce specific surface areas of said cements with a range between 4,500 and 6,000 cm^2/g.

3,615,788

BATTERY PASTE EXPANDER MATERIAL

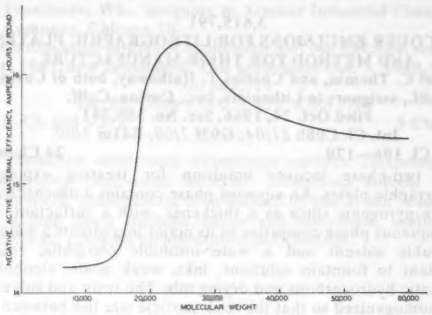
Jack L. Limbert, Daleville; Harry G. Proctor, Muncie, and David T. Poe, Gaston, all of Ind., assignors to General Motors Corporation, Detroit, Mich. Division of Ser. No. 780,067, Nov. 29, 1968, Pat. No. 3,523,041.

Filed Oct. 30, 1969, Ser. No. 871,341

Int. Cl. C08h *15/02*

U.S. Cl. 106—123 **2 Claims**

A battery paste expander material for the negative plate of a lead-acid storage battery including lignosulfonic acid in the molecular weight range of about 20,000 to 30,000 g/g-mol,



less than about 1 percent carbohydrates and about 3–8 percent combined sulfur.

3,615,789

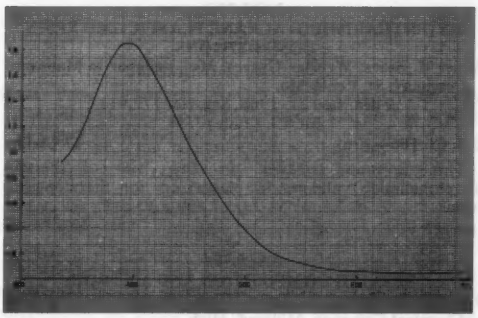
PROCESS FOR THE MANUFACTURE OF ENRICHED COLLOIDAL SILVER

Heinrich Schaller, Fribourg, Switzerland, assignor to Ciba Limited, Basel, Switzerland

Continuation-in-part of application Ser. No. 649,217, June 27, 1967, now abandoned. This application Sept. 15, 1969, Ser. No. 864,932

Int. Cl. C08h *7/00*

U.S. Cl. 106—135 **5 Claims**



Colloidal silver is prepared in enriched form, suitable for the manufacture of photographic antihalation and color filter layers, from an aqueous medium in which the silver is present as a dilute dispersion, by adding a flocculating agent and separating the flocculate at a pH from 3 to 8 and redispersing it in the presence of citrate ions.

3,615,790

GENERAL DYE-ASSIST FOR SYNTHETIC FIBERS

Marion R. Lytton, West Chester, Pa., assignor to FMC Corporation, Philadelphia, Pa.

Filed Apr. 27, 1967, Ser. No. 634,091

Int. Cl. C08b *21/16, 21/20, 27/54*

U.S. Cl. 106—165 **6 Claims**

Artificial, shaped articles of polymeric material having improved dyeability are provided by the incorporation therein of sulfones containing alpha-methylene groups.

The dye receptability of artificially prepared fibers, yarns, fabrics and other shaped articles in often in need of improvement, so that these materials can be deep dyed in various types of dyeing procedures. While methods for improving the dyeability of various artificial fibers, including,

for example, rayons, acetates, triacetates, acrylics, modacrylics, vinyons, sarans and the like are known, such methods generally vary from one type of fiber to another.

3,615,791

LACQUER EMULSIONS FOR LITHOGRAPHIC PLATES AND METHOD FOR THEIR MANUFACTURE

Daniel C. Thomas, and Charles T. Hathaway, both of Covina, Calif., assignors to Lithoplate, Inc., Covina, Calif.

Filed Oct. 24, 1966, Ser. No. 588,741
Int. Cl. C08b *21/04;* **G03f** *7/00;* **B41m** *5/00*
U.S. Cl. 106—170 **24 Claims**

A two-phase lacquer emulsion for treating exposed lithographic plates. An aqueous phase contains a desensitizer and a pyrogenic silica as a thickener, with a surfactant. A nonaqueous phase comprises as its major ingredients a water-insoluble solvent and a water-insoluble oleophilic resin resistant to fountain solutions, inks, weak acids, alcohols, aliphatic hydrocarbons and drying oils. The resin and solvent are homogenized so that the resin particle size lies between 1 and 500 microns. The nonaqueous phase may also include pigment and a nonionic surfactant.

3,615,792

PROCESS FOR THE PREPARATION OF EMULSION COATINGS

Frederick James Keene, Medford Lakes, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed June 13, 1967, Ser. No. 645,603
Int. Cl. C08b *21/12, 21/14;* **B01f** *3/08*
U.S. Cl. 106—170 **4 Claims**

A method for making waterborne coating compositions containing both cellulose derivatives and resin additives comprising the preparation of a cellulose derivative emulsion and a resin emulsion, and then combining them.

3,615,793

BIS (PHTHALIMIDO) ALKANE PLASTICIZED RESIN COMPOSITIONS

James K. Sears, Webster Groves, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 21, 1968, Ser. No. 777,911
Int. Cl. C08h *17/44*
U.S. Cl. 106—176 **17 Claims**

This invention relates to the use of certain bis(phthalimido) alkanes as plasticizers for thermoplastic resins.

3,615,794

SEALING COMPOSITION AND METHOD

Kenneth H. Nimerick, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 20, 1968, Ser. No. 730,578
Int. Cl. C08b *25/00*
U.S. Cl. 106—208 **7 Claims**

A composition of matter and method of temporarily sealing selected intervals of boreholes, said composition comprising a combination of at least one galactomannan gum, a buffering agent, a cross-linking and hydrating agent for said gum, a suspending agent for said gum, and, optionally, degradation agent for said gum and water. The method comprises injecting said composition into said interval in a borehole.

3,615,795

METHOD FOR SIZING PAPER

Oliver J. Schulwitz, and Lloyd E. Herdle, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 19, 1969, Ser. No. 800,742
Int. Cl. G08h *9/00*
U.S. Cl. 106—243 **22 Claims**

Internal sizing of paper and paper products by the method involving addition to the pulp slurry of a fatty acid sizing agent, such as the sodium salt of stearic acid, and precipitation of the sizing agent onto the pulp fibers with a water-soluble polyvalent metal salt, such as alum or aluminum chloride, is improved by incorporating in the slurry a water-soluble polyfunctional carboxylic acid salt. A substantial increase in the resistance of the paper or paper product to penetration by water or aqueous solutions is achieved as a result of the action of the polyfunctional carboxylic acid salt.

3,615,796

ANIONIC QUICK-SET ASPHALT EMULSION

Hans G. Schreuders, Park Forest, Ill., assignor to Nalco Chemical Company, Chicago, Ill.

Filed Sept. 4, 1969, Ser. No. 855,367
Int. Cl. C08h *13/00;* **C08k** *1/62;* **C09d** *3/24*
U.S. Cl. 106—277 **3 Claims**

Quick setting of a bituminous emulsion for slurry seal repair of asphalt road surfaces is achieved by using a water-soluble alkyl petroleum sulfonate salt (Na) as the emulsifying agent.

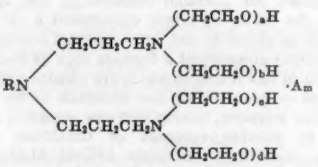
3,615,797

BITUMINOUS COMPOSITIONS HAVING HIGH ADHESIVE PROPERTIES AND METHOD OF PRODUCING SAME

Shunzo Ohtsuka, and Tadashi Doi, both of Wakayama-shi, Japan, assignors to Kao Soap Co. Ltd., Tokyo, Japan

Filed Jan. 12, 1970, Ser. No. 002,358
Int. Cl. C08h *13/00, 17/22;* **C08j** *1/46*
U.S. Cl. 106—278 **6 Claims**

A method of making a bitumen having high adhesion properties, in which there is added to the bitumen from 0.2 to 1.0 percent, based on the weight of the bitumen, of an ethylene oxide condensate of a long chain alkyl triamine represented by the general formula:



wherein R is an alkyl or alkenyl radical of eight to 22 carbon atoms; *a*, *b*, *c* and *d* are integers from 1 to 7 and the sum of $a+b+c+d$ is from 4 to 10; A is an organic or inorganic acid and *m* is 0 or an integer from 1 to 3, its acid salts and mixtures thereof.

3,615,798

ASPHALT EMULSIONS

Gene N. Woodruff, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Sept. 18, 1968, Ser. No. 760,706
Int. Cl. C08h *13/00;* **C08k** *17/02;* **C09d** *17/11*
U.S. Cl. 106—277 **10 Claims**

Stable oil-in-water emulsions of N,N-dimethyl sulfenyl dithiocarbamates rodent repellents, with asphalt and polyolefins, are prepared using emulsifying agents selected from certain amphoteric, nonionic, and anionic emulsifiers, which emulsions can be readily applied to surfaces to render same rodent and roach repellent.

3,615,799

METHOD OF PREPARING SPRAYABLE BITUMINOUS COMPOSITION

Charles R. Gannon, Ashland, Ky., and William H. Gilkerson, Huntington, W. Va., assignors to Ashland Oil, Inc., Houston, Tex.

Filed Jan. 26, 1968, Ser. No. 700,732
Int. Cl. C08h *13/00, 17/22;* C08j *1/46*
U.S. Cl. 106—278 4 Claims

A bituminous composition, capable of being sprayed at ambient conditions and particularly useful as a soil stabilizer, including, a major proportion of a highly aromatic, bituminous material, such as thermally cracked pitch, in an amount between about 35 percent and 75 percent, a predominantly paraffinic solvent, such as kerosene, in an amount between about 15 percent and 35 percent, a predominantly naphthenic solvent, such as naphtha, in an amount between about 5 percent and 20 percent, and methylene chloride, in an amount between about 5 percent and 20 percent; and the method of preparing this composition, including, heating the bituminous material to a temperature above its melting point and pumping the same into a blending tank equipped with cooling coils and an impeller-type mixer, immediately adding the paraffinic solvent to the bituminous material at a slow rate while agitating and cooling, thereafter adding the naphthenic solvent to the mixture when the temperature of the mixture reaches a point above 25° F. below the boiling point of the naphthenic solvent, agitating and cooling the mixture until the mixture reaches a temperature between about 100 and 105° F., and slowly adding the methylene chloride, while continuing cooling to essentially ambient temperature over an extended period of time, such as 30 minutes.

3,615,800

PROCESS FOR CONVERTING PERYLENE-3,4,9,10-TETRACARBOXYLIC ACID DIIMIDE INTO A PIGMENT FORM HAVING VALUABLE COLORISTIC PROPERTIES

Ernst Spietschka, Oberauroff, and Walter Deucker, Lorsbach, Taunus, both of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister, Lucius & Bruning, Frankfurt am Main, Germany

Filed June 11, 1968, Ser. No. 735,985
Claims priority, application Germany, June 19, 1967, F 52723
Int. Cl. C08h *17/14*
U.S. Cl. 106—228 Q 3 Claims

Process for converting perylene-3,4,9,10-tetracarboxylic - tetracarboxylic acid diimide into a pigment having valuable by grinding the peryleneimide in inert organic solvents at a temperature of up to about 50° C.

3,615,801

SURFACE COATING COMPOSITIONS

Raymond Joseph Marklow, and William Ian Williamson, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation-in-part of application Ser. No. 506,398, Nov. 4, 1965, now abandoned. This application Sept. 29, 1969, Ser. No. 862,089
Int. Cl. C08h *13/00, 17/22;* C08i *1/46*
U.S. Cl. 106—278 8 Claims

Compositions suitable for the preparation of surface coatings which comprise a solution, in a solvent inert to isocyanate groups, of a product containing free isocyanate groups obtained by reacting together a coal tar pitch, optionally at least one other compound containing isocyanate-reactive groups, and an excess of a polyisocyanate composition comprising a mixture of methylene-bridged polyphenyl polyisocyanates containing from about 85 to about 30 percent by weight of methylene bis(phenylisocyanate), the remainder of the mixture being methylene-bridged polyphenyl polyisocyanates having a functionality higher than 2.

3,615,802

THIXOTROPIC BITUMINOUS CUTBACK COMPOSITIONS AND PROCESS

Roy J. Betty, Jr., Chicago, Ill., and Robert D. Timmons, Fennimore, Wis., assignors to Armour Industrial Chemical Company, Chicago, Ill.

Continuation-in-part of application Ser. No. 664,624, Aug. 31, 1967, now abandoned. This application Oct. 3, 1969, Ser. No. 863,711
Int. Cl. C08h *13/00, 17/22;* C08i *1/46*
U.S. Cl. 106—278 9 Claims

Thickened thixotropic bituminous cutback compositions comprising bituminous material, bituminous solvent and monomeric disubstituted urea formed by the in situ reaction of a long chain aliphatic amine and isocyanate, useful as adhesives, caulking compositions, and coatings.

3,615,803

ASPHALT-ASBESTOS PLASTIC CEMENT

Homer L. Draper, and Wayne E. McLaughlin, both of Bartlesville, Calif., assignors to Phillips Petroleum Company

Filed Aug. 1, 1968, Ser. No. 749,282
Int. Cl. C08h *13/100, 17/22;* C08i *1/46*
U.S. Cl. 106—280 2 Claims

An asphalt material such as an asphalt cement is combined with asbestos fibers and a solvent. There is contained in the final admixture a polymeric isobutylene in a minor amount of the order of about 0.1 to about 3 weight percent of the final mix, which upon evaporation of the solvent, is desirably cohesive and adhesive.

3,615,804

BITUMINOUS PAVING MIX

Hans Peter Defregger, Munich, and Georgi Georgieff, Erkrath-Unterbach, both of Germany, assignors to Walter de Couet Strabenbau und Tiefbau

Filed Dec. 30, 1968, Ser. No. 788,090
Claims priority, application Germany, Jan. 9, 1968, P 18 00 147.3
Int. Cl. C08h *13/00, 17/10, 17/16*
U.S. Cl. 106—281 2 Claims

A street-covering mix comprising crushed gravel, sand, bituminous binding agents, and a filler with a plurality of components; the proportions of gravel, sand and bituminous binders comprise the greater amount, as used in fluid asphalt and asphalt beton, the proportion of filler being decreased; at least one component of the filler being selected to increase the structural viscosity of the mastic formed from the filler and bituminous binding agent.

3,615,805

BETA-PHASE PHTHALOCYANINE PIGMENT

Felix Frederick Ehrich, Westfield, and Howard Matrick, Springfield, both of N.J., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 1, 1968, Ser. No. 764,329
Int. Cl. C08h *17/04*
U.S. Cl. 106—288 Q 2 Claims

Beta-phase copper phthalocyanine admixed with at least 0.1 percent by weight of a reaction product of pyridine, phthalonitrile and cupric chloride, a pigment having improved resistance to crystal growth at elevated temperature or in crystallizing solvents.

3,615,806

KAOLIN PIGMENTS AND METHODS OF PRODUCING THE SAME

Andrew Torock, Morris Plains, and Thomas F. Walsh, Parsippany, both of N.J., assignors to Georgia Kaolin Company

Filed Dec. 10, 1968, Ser. No. 782,722
Int. Cl. C08h *17/06*; C09c *1/28*
U.S. Cl. 106—288 B 3 Claims

A new kaolin pigment and method of producing the same are provided in which the pigment is made up of thin, platelike particles having an equivalent spherical diameter by Stokesian methods greater than 2 microns, an average aspect ratio of thickness to diameter of about 1:20, and being substantially free of stacks and produced by delaminating a slurry having particles not less than 5 microns e.s.d. until substantially free of stacks, removing the particles of less than 2 microns e.s.d. and recovering the remainder as the product.

3,615,807

POSITIVELY CHARGED FIBROUS CERIUM PHOSPHATE

Paul Clifford Yates, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 1, 1969, Ser. No. 812,443
Int. Cl. C09c *1/00, 1/14, 1/36*
U.S. Cl. 106—288 B 7 Claims

The positively charged fibrous cerium phosphates of this invention comprise colloidal fibrous crystalline cerium phosphate which contains at least 5 mole percent based on the number of moles of phosphorous of at least one +3 or +4 valent metal ion from the group of titanium, zirconium, hafnium, chromium, molybdenum, tungsten, manganese, aluminum, iron, cobalt, cerium, the rare earths, thorium, tin and lead.

3,615,808

NONFLOCCULATING PIGMENT PREPARATIONS AND PROCESSES FOR THEIR MANUFACTURE

Peter Eckert, Magden, and Anton Elsener, Birsfelden, both of Switzerland, assignors to Ciba Limited, Basel, Switzerland

Filed June 5, 1968, Ser. No. 734,524
Claims priority, application Switzerland, June 16, 1967, 8581
Int. Cl. C08h *17/02*
U.S. Cl. 106—288 Q 3 Claims

The present invention concerns a nonflocculating pigment preparation which contains a pigment and 2 to 20 percent of cellulose nitrate and a process for its manufacture wherein a pigment and cellulose nitrate are mixed together. These preparations are useful for coloring plastic masses and lacquers.

3,615,809

COMPACTED PIGMENT COMPOSITIONS

Floyd B. Nagle, Midland; Kenneth R. Hock, Gladwin, and Winfield Scott Haynes, Jr., Freeland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sept. 26, 1968, Ser. No. 763,009
Int. Cl. C08s *1/36*; C09c *1/36*
U.S. Cl. 106—300 4 Claims

The invention relates to pigmented or colored thermoplastic polymers and pertains especially to compacted pigment compositions that are readily dispersed in thermoplastic polymers to make uniformly colored or pigmented polymer articles.

3,615,810

PRODUCTION OF TEMPERATURE-STABLE IRON-MANGANESE OXIDE BLACK PIGMENT

Wilhelm Holznagel, Krefeld; Franz Hund, Krefeld-Bockum, and Gottfried Gerlach, Krefeld, all of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 13, 1969, Ser. No. 833,146
Claims priority, application Germany, June 26, 1968, P 17 67 868.1
Int. Cl. C09c *1/24*
U.S. Cl. 106—304 18 Claims

Process for the production of a temperature-stable solid black pigment of high tinting strength consisting essentially of mixed oxides of iron and manganese, by calcining an intimate finely divided mixture of oxidic or oxide-forming starting materials of iron and manganese, e.g., Fe_3O_4, $Fe(OH)_3$, FeOOH and active Fe_2O_3 and $MnCO_3$, Mn_2O_3, MnOOH and pyrolusite (i.e., MnO_2), in a ratio by weight corresponding to 25–90 parts of Mn_2O_3 to 75–10 parts of Fe_2O_3, at a temperature of about 800°–920° C. in an atmosphere having an oxygen content of about 7–20 percent by volume, optionally in the presence of an alkali metal salt, e.g., NaCl, or boron oxide, as mineralizer; and the corresponding pigment thereby produced.

3,615,811

CARBONATE COMPOSITIONS AND PROCESS

Robert C. Barrett, Cartersville, Ga., assignor to Chemical Products Corporation, Cartersville, Ga.

Filed Feb. 29, 1968, Ser. No. 709,441
Int. Cl. C09c *1/02, 3/02*
U.S. Cl. 106—306 11 Claims

Alkaline earth carbonates, together with dispersants and binder additives are dried to provide products particularly suitable for bulk handling, storage and shipment. The product can be prepared in such manner as to have excellent dry flow characteristics, good pellicle strength and moderately high bulk density, while retaining the small particle size of the individual alkaline earth crystallites of which the dried pellicles are formed. The products may be particularly adapted for use in ceramic industries and/or may be adapted for use in aqueous suspensions, in which cases they are provided with ready dispersability and high reactivity.

3,615,812

RESIN COATED PIGMENTS AND PROCESS THEREFOR

Daniel Clark, and Edward H. Krumm, both of Holland, Mich., assignors to Chemetron Corporation, Chicago, Ill.

Continuation of application Ser. No. 395,045, Sept. 8, 1964, now abandoned. This application Feb. 19, 1969, Ser. No. 805,950
Int. Cl. C08j *1/10*
U.S. Cl. 106—308 M 14 Claims

A resin coated pigment is produced by intermixing a pigment in the form of a water wet press cake into a resin while maintaining the resin in the form of a stiff, doughlike mass to effect a hot dry plastic pigment-resin dispersion. The process results in a resin coated pigment of high pigment concentration being grit-free and having high tinctorial strength.

3,615,813

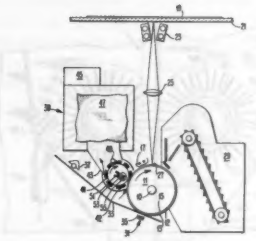
ELECTROPHOTOGRAPHIC LAYER CLEANING PROCESS AND APPARATUS

Francis R. Clarke, and Clifford E. Herrick, Jr., both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 19, 1969, Ser. No. 825,910
Int. Cl. G03g *13/00, 15/00*
U.S. Cl. 134—1 8 Claims

An electrophotographic element is cleaned of residual toner by providing a cleaning means such as a rotating brush

in contact with the element or an airblast to remove residual toner particles from the element while also providing means



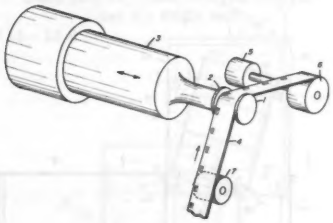
such as a fluorescent lamp to concurrently illuminate the portion of the element being cleaned.

3,615,814

METHOD OF AND APPARATUS FOR ULTRASONICALLY CLEANING A WEB OF FILM

Howard F. Victor Ott, and Jerry Carmen, both of Spenceport, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 25, 1969, Ser. No. 879,680
Int. Cl. B08b *7/02*
U.S. Cl. 134—1 **5 Claims**



Dirt particles are cleaned from a web of flexible material such as photographic film or paper by applying ultrasonic vibrations to the web in a direction transversely of the web. The cleaning apparatus comprises an ultrasonic horn having a pair of circular opposed shoulders spaced from one another lengthwise of the horn, defining a circular channel between the shoulders for confining the web, and mechanism for advancing the web through the channel in contact with the shoulders.

3,615,815

METAL CLEANING PROCESS

Eugene Wainer, Shaker Heights, Ohio, assignor to Horizons Incorporated, a Division of Horizons Research Incorporated

Filed Mar. 3, 1969, Ser. No. 804,018
Int. Cl. C23g *1/28, 1/32*
U.S. Cl. 134—2 **12 Claims**

This invention is an improvement on my U.S. Pat. No. 3,000,766 and is directed to the recovery of metal values in scrap materials by separating the metal values from any nonmetallic material associated therewith, such as insulation on wires or other electrical equipment. The improvement resides in carrying out the removal of unwanted nonmetallic materials in two separate stages, the second of which is similar to that described in U.S. Pat. No. 3,000,766, but is carried out much more efficiently because of the treatment which prepares the scrap for this step. In the first stage, a substantial amount of the nonmetallic material is removed by either burning or immersion in a nonoxidizing fused salt melt.

3,615,816

COMPOSITION AND USE THEREOF FOR REMOVAL OF DEPOSITS FROM A METAL SURFACE

Theodore E. Majewski, and Arthur J. Pastor, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 2, 1969, Ser. No. 788,654
Int. Cl. C23g *1/02*
U.S. Cl. 134—3 **8 Claims**

Deposits are removed effectively from a metal surface to which they are adhering by contacting such solids with a composition comprising by weight of from about 1 to about 6 percent CrO_3, from about 38 to about 60 percent H_2SO_4, and balance substantially water, to solubilize the deposits and removing the so used composition containing solubilized deposits.

3,615,817

METHOD OF DECONTAMINATING RADIOACTIVE METAL SURFACES

William T. Jordan, Pittsburgh, Pa., and Cort A. Zimmerman, Idaho Falls, Idaho, assignors to The United States of America as represented by the United States Atomic Energy Commission

Filed Feb. 4, 1969, Ser. No. 796,579
Int. Cl. C23g *1/08*
U.S. Cl. 134—3 **2 Claims**

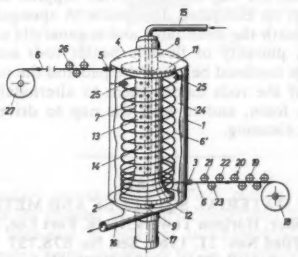
A method of decontaminating radioactive metal surfaces and particularly difficultly accessible radioactive surfaces such as the ceiling and walls of a reactor vessel. The decontamination is accomplished by carrying a decontaminating reagent to the surfaces in a foam. Consecutive applications of alkaline permanganate and oxalic acid in foam give particularly good results. A nonionic foaming agent should be employed when the foaming agent may come into contact with a solution containing aluminum ions.

3,615,818

PROCESS AND APPARATUS FOR A CONTINUOUS PICKLING OF WIRE

Othmar Ruthner, Vienna, Austria, assignor to Ruther Industriplanungs-Aktiengesellschaft, Vienna, Austria

Filed Nov. 5, 1969, Ser. No. 874,215
Claims priority, application Austria, Nov. 25, 1968, A11411
Int. Cl. B08b *3/02*; **C23g** *3/02*
U.S. Cl. 134—3 **5 Claims**



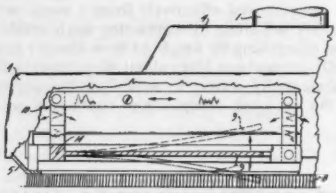
Process and apparatus for a continuous pickling of wire in a vertical processing container, through which the stock to be pickled is moved in a vertical direction in the form of a helix and without a backing at least on one side and is treated with pickling acid.

3,615,819

NAP-SURFACE CLEANING WITH TUNED FREQUENCY BEATERS

Thomas K. Cauley, Fairlawn Village, Ohio, assignor to Bissell Inc., Grand Rapids, Mich.

Filed Jan. 19, 1970, Ser. No. 3,692
Int. Cl. A47l *11/00, 11/12*
U.S. Cl. 134—6 9 Claims



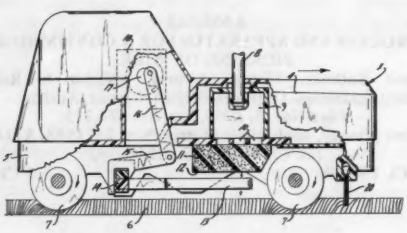
A nap-surface cleaning device includes a plurality of flexible rodlike beaters which oscillate to beat the surface and loosen dirt embedded therein. A motor drives the rods at a beating frequency. The rods are constructed so that their natural resonant frequency is closed correlated with the beating frequency.

3,615,820

SHAMPOOER WITH IMPROVED FOAM-GENERATING ACTION

Wallace D. Herrick, Grand Rapids, Mich., assignor to Bissell Inc., Grand Rapids, Mich.

Filed Jan. 19, 1970, Ser. No. 3,693
Int. Cl. A47l *11/00, 11/12*
U.S. Cl. 134—6 10 Claims



A shampooer for nap surfaces which supplies shampoo in liquid form to an elongated distributor. A spongelike pad is mounted beneath the distributor and is generally coextensive therewith. A plurality of flexible beater rods are disposed with their tips confined between the pad and the nap surface. Oscillation of the rods causes them to alternately beat the pad to form foam, and to beat the nap to drive the foam thereinto for cleaning.

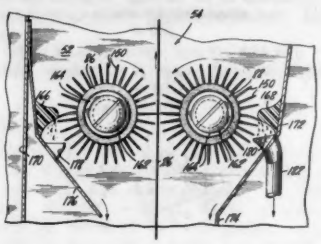
3,615,821

STRIP MATERIAL SQUEEGEE AND METHOD

Arthur J. Miller, Horizon Towers North, Fort Lee, N.J.

Filed Nov. 21, 1969, Ser. No. 878,757
Int. Cl. F26b *13/04;* B08b *3/10*
U.S. Cl. 134—10 21 Claims

Squeegee and method for stripping solvent from the surfaces of perishable strip materials, such as motion picture film and the like. More specifically, the strip material is passed between, but does not engage, one or more sets of opposed, spaced-apart rollers that are rotated at high speed against the direction of movement of the material to pump at high velocity a fluid stream, such as air or some other suitable gas, through the spaces between the rollers and the adjacent material surfaces, thereby removing the solvent adhering to the material. Seal members may be provided to prevent leakage around the rollers of the drying fluid stream and the solvent transferred to the rollers from the strip material, while conduits associated with the seal members recover the solvent picked up by the rollers.

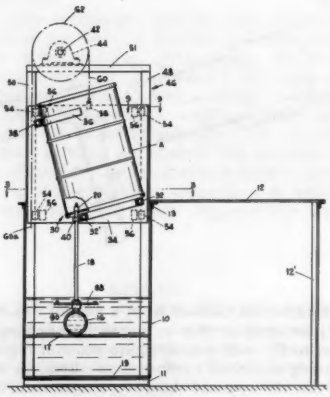


3,615,822

METHODS AND APPARATUS FOR CLEANING DRUMS

Jerry J. Molinari, Newark, N.J., assignor to Kingsland Drum & Barrel Co. Inc., Newark, N.J.

Filed Dec. 9, 1968, Ser. No. 782,342
Int. Cl. B08b *9/12*
U.S. Cl. 134—23 16 Claims



A method of and apparatus for cleaning drums of the type having a bung opening in the cover which employs a tank having a plurality of nozzle pipes positioned in the tank. The nozzle pipes are stationary or in a fixed position, one for each drum to be cleaned. The drums are supported so that their bung openings are facing and in alignment with the nozzle pipes. The drums are moved over the stationary nozzle pipes and retracted. During the reciprocable movement of the drums a cleaning solution is sprayed against the interior surfaces of the drums.

3,615,823

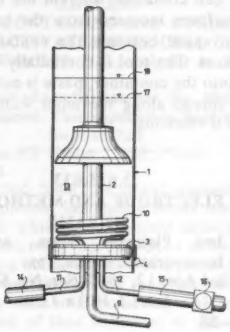
METHOD OF CLEANSING AND/OR STERILIZING THE FILLER TUBE IN PACKAGING MACHINES

Alex Tuma, Loddekopinge, and Jan Ingvar Hansson, Lomma, both of Sweden, assignors to AB Tetra Pak, Lund, Sweden

Filed Feb. 17, 1969, Ser. No. 799,560
Claims priority, application Sweden, Mar. 1, 1968, 2773/68
Int. Cl. B08b *3/10;* A61l *1/00*
U.S. Cl. 134—24 7 Claims

A method of washing, i.e. cleansing and/or sterilizing a

packaging machine filler tube by closing one end of the tubular packaging material to form a closed space around the



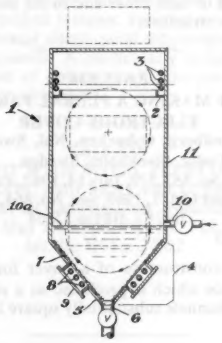
filler tube, introducing a liquid washing agent into the space thus formed and then heating the agent.

3,615,824

METHOD FOR CLEANING SMALL PARTS

George T. Hittel, Midland, and Thomas F. Rozek, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed July 31, 1968, Ser. No. 749,123
Int. Cl. B08b *3/06*
U.S. Cl. 134—25 R 1 Claim



A process and apparatus for cleaning metal parts comprising introducing the metal part into an enclosure which has sufficient volume to enable the part to alternately enter a vapor zone and a liquid zone each within the enclosure, while the part is freely moving within a confined area.

3,615,825

PAINT-STRIPPING COMPOSITION

Robert E. Gansser, Riverview, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Feb. 24, 1969, Ser. No. 801,788
Int. Cl. C09d *9/00*; C11d *7/06*
U.S. Cl. 134—38 5 Claims

Paint-stripping compositions are prepared by combining alkoxyalkyl amines with alkaline solutions. These compositions are effective for stripping paints, particularly enamel paints, from metals and surfaces of other materials.

3,615,826

PROCESS FOR CLEANING OVENS AND LIKE DEVICES

Alfred P. Brill, 5522 E. Tomahawk Drive, Greensboro, N.C., and Leroy H. Keiser, 4001 Moorland Drive, Midland, Mich.

Filed Nov. 24, 1969, Ser. No. 879,530
Int. Cl. B08b *17/02, 3/08*; C09k *3/00*
U.S. Cl. 134—29 12 Claims

A process for cleaning food spills from ovens and the like devices which comprises the steps of applying a composition which consists essentially of from 1 to 35 percent by weight of a polydimethylsiloxane having a viscosity of at least 3000 cs. at 25° C., from 0.5 to 5.5 percent by weight of a siloxane resin composed of $SiO_{4/2}$ units and $(CH_3)_3SiO_{1/2}$ units in the ratio of 1:0.6–1.2, from 0.1 to 9 percent by weight of a metal oxide, and the balance solvent, to the clean and essentially dry surfaces of the oven or like device, and then, after the oven or device has been employed one or more times for heating food, cleaning the food spills therefrom, said cleaning being facilitated by said composition.

3,615,827

PAINT-STRIPPING COMPOSITION AND METHOD

Donald P. Murphy, Roseville, Mich., assignor to Hooker Chemical Corporation, Niagara Falls, N.Y.

Continuation of application Ser. No. 459,903, May 28, 1965, now abandoned. This application Mar. 5, 1969, Ser. No. 806,034
Int. Cl. B08b *7/00*; C23g *1/14*
U.S. Cl. 134—38 10 Claims

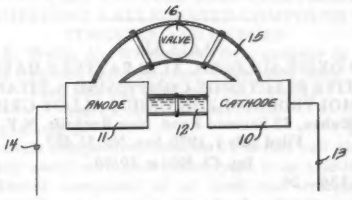
A paint-stripping composition comprising an alkali metal hydroxide and an accelerator composition of a polyalkylene glycol and ethylene glycol monophenyl ether. Preferably, the activator composition is made up of tripropylene glycol and ethylene glycol monophenyl ether.

3,615,828

SECONDARY POWER-PRODUCING CELL

Albert K. Fischer, Western Springs, Ill., assignor to The United States of America as represented by the United States Atomic Energy Commission

Filed Mar. 9, 1970, Ser. No. 17,404
Int. Cl. H01m *35/02*
U.S. Cl. 136—6 4 Claims



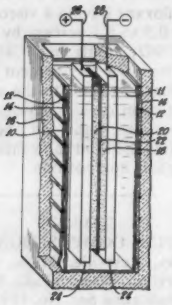
A secondary power-producing cell consists of an anode and a cathode formed of binary compounds containing the same two elements in different stoichiometric proportions, the electrodes being separated by an electrolyte containing ions of the element that is to be transported therethrough. During operation ions of the electropositive component of the electrode compounds transfer through the electrolyte from the anode to the cathode until the concentration thereof in the cathode approaches that in the anode. At this time the cell voltage decreases and the cell must be regenerated. The electronegative component of the cathode compound is then distilled from the cathode to the anode. Polarity of the electrodes is thereby reversed and operation of the cell may be resumed. For example the anode may be Li_3P, the cathode Li_2P_5 and the electrolyte may be the LiF-LiCl-LiI eutectic.

3,615,829

NOVEL CARBON COMPOSITIONS, METHODS OF PRODUCTION, AND USE

James W. Sprague, Streetsboro, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed July 12, 1965, Ser. No. 471,097
Int. Cl. C14c 3/34; H01m 13/02, 35/00
U.S. Cl. 136—6 15 Claims



An improved electrode material for electrical energy storage devices is provided by heating a carbonaceous material to provide a charred residue, then treating this charred residue in a fused salt bath under reducing and oxidizing (in the absence of oxygen) conditions. The resulting material contains occluded salts and these may, in a preferred embodiment, be removed.

3,615,830

ZINC ADDITIVE IN NICKEL CADMIUM CELLS

Daniel Hiram Johnson, Parma Heights, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Aug. 13, 1969, Ser. No. 849,913
Int. Cl. H01m 35/00, 43/04
U.S. Cl. 136—6 10 Claims

Improvement in the operating characteristics of nickel cadmium cells is effected by presence of zinc in the positive electrode thereof in an amount exceeding the amount of zinc which would be required to saturate the electrolyte of the cell.

3,615,831

LEAD OXIDE-SULFURIC ACID BATTERY HAVING A POSITIVE ELECTRODE COMPRISING A TITANIUM-MOLYBDENUM-ZIRCONIUM ALLOY GRID

Samuel Ruben, 52 Seacord Road, New Rochelle, N.Y.

Filed July 1, 1970, Ser. No. 51,457
Int. Cl. H01m 39/00
U.S. Cl. 136—26 6 Claims

The invention is a lead-acid rechargeable cell in which the positive electrode comprises a base of a titanium-molybdenum-zirconium alloy having a surface film of a nonpolarizing element, such as gold, and an active lead oxide coating over said nonpolarizing surface.

3,615,832

METHOD OF EXTRUDING AN ELECTRODE

James P. Malloy, Cheltenham, and Ronald R. Nilson, Philadelphia, both of Pa., assignors to ESB Incorporated

Filed Oct. 11, 1968, Ser. No. 766,906
Int. Cl. H01m 39/00
U.S. Cl. 136—27 5 Claims

A method of extruding an electrode along the inner surfaces of a cylindrical cell container and a cell having such an electrode. A quantity of an electrode active material is placed in the bottom of the container and a rapidly spinning, cruciform-shaped tool is lowered into the container and extrudes the active material along the container walls. The particular application of the method involves forming a gridless lead electrode in the cell container whereby the cell walls support the active material. A modified tool is used for a rectangular cell container wherein the tool is rectangular, having two surfaces recessed from the tool edges so as to form an open space between the container walls and the recessed surfaces. The tool is continually vibrated and when it is lowered into the container, paste is extruded up the open space and is spread along the inner walls of the container while the tool is vibrating.

3,615,833

BATTERY ELECTRODE AND METHOD OF MAKING THE SAME

Ernest M. Jost, Plainville, Mass., assignor to Texas Instrument Incorporated, Dallas, Tex.

Filed Apr. 12, 1967, Ser. No. 630,272
Int. Cl. H01n 43/04
U.S. Cl. 136—28 5 Claims

A nickel electrode for an alkaline electrolyte battery is shown to incorporate electrochemically active nickel material secured to an electrically conductive substrate and to have an electrochemically active substance such as silver oxide, manganese dioxide or ferric hydroxide of more positive electrochemical potential than the active nickel material dispersed in the active nickel material for retarding the evolution of oxygen at the electrode during charging of the battery.

The nickel electrode is made by mixing particles of the active nickel material in its charged state together with particles of a fusible binder and with particles of the material of more positive electrochemical potential, the latter material being in its discharged state. This particulate mixture is then spread upon an electrically conductive substrate and is heated to fuse the binder particles for securing the other mixture particles to each other and to the substrate to form a porous electrode structure.

3,615,834

METHOD OF MAKING A PLURAL PARALLEL ROD ELECTRODE COVER

Erik Gustav Sundberg, Osbacken, Nol, Sweden, assignor to Aktiebolaget Tudor, Stockholm, Sweden

Division of Ser. No. 653,379, July 14, 1967, Pat. No. 3,503,807
Filed Oct. 7, 1969, Ser. No. 864,332
Int. Cl. H01m 35/04
U.S. Cl. 136—43 17 Claims

Methods for construction of a cover for a plural active element electrode which is produced as a single unit having plural parallel channels substantially square in cross section.

3,615,835

GENERATION OF DC VOLTAGE

Stanford R. Ovshinsky, Bloomfield Hills, Mich., assignor to Energy Conversion Devices, Inc., Troy, Mich.

Continuation-in-part of application Ser. No. 575,675, Aug. 29, 1966, now abandoned, which is a continuation-in-part of application Ser. No. 198,849, May 31, 1962, now abandoned.
This application Jan. 16, 1969, Ser. No. 813,777
Int. Cl. H01m 27/00
U.S. Cl. 136—83 R 12 Claims

A room temperature DC voltage generating device comprising a solid body of lithium metal carrying on and in direct contact with at least a part of its surface a solid layer of a composition consisting essentially of at least one oxygen-containing lithium compound such as lithium nitrate or lithium sulfate, or lithium chloride or lithium bromide, said solid layer being effective to prevent direct contact of a water-moisture-containing gaseous environment with said body of lithium metal in the area of said solid layer, an electrical circuit including electrical contacts respectively connecting (i) said body of solid lithium metal, and (ii) said solid layer, and means providing a water-moisture-containing

gaseous environment whereby to moisten said layer, generation of DC voltage occurring on contact of said moisture with said layer.

3,615,836

FUEL CELL CONTAINING AND A PROCESS OF MAKING AN ACTIVATED FUEL CELL CATALYST

John S. Batzold, Westfield, N.J., assignor to Esso Research and Engineering

Continuation-in-part of application Ser. No. 394,622, Sept. 4, 1964, now abandoned. This application June 1, 1967, Ser. No. 642,722

Int. Cl. H01m 27/10, 13/04

U.S. Cl. 136—86 D 10 Claims

A catalyst selected from the group consisting of noble metals, transition metals, lanthanide series metals, mixtures and alloys thereof, which have limited activity because of absorbed halide ions, may be employed in electrodes of a fuel cell containing a halide ion free acid electrolyte provided that, prior to its operation in the fuel cell, the catalyst has been treated with a basic solution having a pH in the range of 8 to 14 for a period of time sufficient to desorb the halide ions.

3,615,837

ALKALI METAL DIHYDROGEN PHOSPHATE MELT ELECTROLYTES

Morton Beltzer, New York, N.Y., assignor to Esso Research and Engineering Company

Filed Apr. 1, 1968, Ser. No. 717,952

Int. Cl. H01m 11/00, 27/00

U.S. Cl. 136—86 3 Claims

Due to its scarcity and expense as compared with its activity, noble metals have become less desirable as fuel cell catalysts. As a result, nonnoble metals have found increasing use in fuel cell operations. Satisfactory performance of such cells, however, can only be obtained when they are operated at relatively high temperatures of 200° C. to 300° C. One problem encountered at these high temperatures is that art-known electrolytes become too corrosive, necessitating the use of other electrolyte systems. Satisfactory electrolytes can be made from several alkali metal dihydrogen phosphates as the initial components. A particularly desirable electrolyte consists of a melt of potassium dihydrogen phosphate and sodium dihydrogen phosphate.

3,615,838

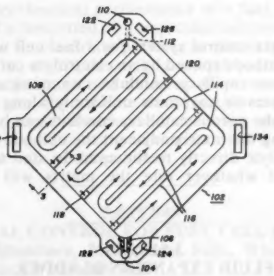
FUEL CELL UNIT WITH NOVEL FLUID DISTRIBUTION DRAIN, AND VENT FEATURES

Albert C. Erickson, 28 Coolidge Park, Wakefield, Mass.

Filed May 10, 1968, Ser. No. 728,164

Int. Cl. H01m 27/02

U.S. Cl. 136—86 11 Claims



A fuel cell is provided with reactant and electrolyte gaskets each defining a central area having a fluid distributor located therein. The electrolyte gasket is provided with notched or apertured fingers to uniformly distribute fluid while the reactant frames may be similarly constructed or provided with stacked screens having offset apertures.

3,615,839

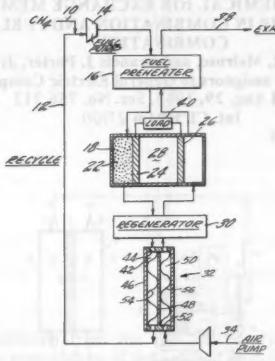
FUEL CELL SYSTEM WITH RECYCLE STREAM

Russell A. Thompson, Glastonbury; Alexander H. Levy, Bloomfield, Conn., and Eugene M. Hoyle, Santa Clara, Calif., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed July 12, 1968, Ser. No. 744,396

Int. Cl. H01m 27/14

U.S. Cl. 136—86 C 5 Claims



A high-temperature integrated fuel cell system with high overall thermal efficiency is achieved by utilizing fuel cell waste heat as the source of energy for the fuel-reforming process. A hydrocarbon fuel is mixed with a recycle stream containing water vapor and the mixture is introduced into the anode chamber of a high-temperature molten carbonate fuel cell. Within the anode chamber is a suitable catalyst which, with the addition of fuel cell waste heat, produces a hydrogen-rich stream. Hydrogen reacts electrochemically at the anode. The anode effluent essentially contains hydrogen, carbon dioxide, and steam. Carbon dioxide and a portion of the water is removed from the anode effluent and is transferred to the process air supply since a relatively high concentration of carbon dioxide is desirable at the cathode in the molten carbonate system. The remaining moist anode stream is recycled to be mixed with the fresh fuel.

3,615,840

FUEL CELL AND FUEL CELL ELECTRODE COMPRISING A SULFURATED COMPOUND OF TUNGSTEN AND OXYGEN

William R. Wolfe, Jr., Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed July 22, 1968, Ser. No. 746,325

Int. Cl. H01m 27/04, 13/00

U.S. Cl. 136—86 D 9 Claims

A relatively inexpensive catalyst for a fuel cell electrode, particularly useful with acid electrolytes, is an acid-insoluble solid material composed of at least one compound of tungsten and oxygen wherein the valence of tungsten ranges from four to six and at least one sulfurated compound of tungsten, wherein tungsten has a valence of four, e.g., tungsten disulfide, at least the exposed regions of said solid material containing said sulfurated compound of tungsten, the ratio of oxygen-to-sulfur in said solid material being 80:1–1:80.

3,615,841

ELECTROCHEMICAL CELL

Stanley W. Smith, Talcottville; Edward I. Thiery, Winsted, Conn., and Jose D. Giner, Sudbury, Mass., assignors to Leesona Corporation, Warwick, R.I.

Continuation-in-part of application Ser. No. 491,826, Sept. 30, 1965, now abandoned. This application July 31, 1968, Ser. No. 748,940

Int. Cl. H01m 27/00, 13/00

U.S. Cl. 136—86 10 Claims

A method of forming lightweight electrodes is described comprising forming an admixture of electrochemically active

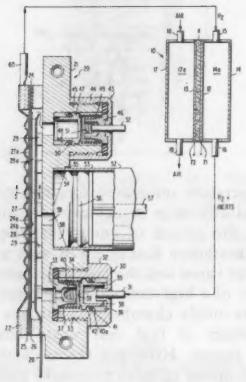
metal and hydrophobic polymer in a fluid medium, applying said admixture to a porous metal support, lightly pressing the admixture into and around the metal support and thereafter heating in the absence of applied pressure at a temperature sufficient to bond said polymer particles to each other and to said support.

3,615,842

METHOD AND APPARATUS COMPRISING AN ELECTROCHEMICAL ION EXCHANGE MEMBRANE PURGE PUMP IN COMBINATION AND FUEL CELL COMBINATION

Donald W. Craft, Melrose, and Francis J. Porter, Jr., Beverly, both of Mass., assignors to General Electric Company

Filed Aug. 29, 1968, Ser. No. 756,212
Int. Cl. H01m *27/00*
U.S. Cl. 136—86 **4 Claims**



A purge pump is arranged for removing inert gases and impurities from the reactant gases in fuel cells or fuel cell systems. Normal operation of fuel cells results in the accumulation of inert gases in the reactant gases after a period of operation, ultimately tending to blanket an electrode, causing the performance of the fuel cell to deteriorate. The purge pump, which is arranged to remove such materials at intervals, includes a housing incorporating an ion exchange membrane with electrodes on opposite sides thereof. Current collectors engaging the electrodes are formed of corrugated shape, the corrugations of one collector being transverse to those of the other collector. A chamber is provided adjacent one electrode for accumulating inert gases received from the fuel cell system. The housing of the purge pump has incorporated therewith an inlet valve at one end of the chamber for conducting inert gases from the system to the chamber and a second valve at the other end of the chamber for effecting discharge of inert gases from the chamber at intervals. When the inert gases accumulate in the chamber to an extent affecting performance by a predetermined amount an associated electrical circuit causes reversal of current through the purge pump. This results in an increase in pressure in the chamber causing the inlet valve to close and the discharge valve to open, thereby effecting a purging of the inert gases from the chamber. The circuit is arranged to return the system to normal operation after a time which insures complete purging without excessive loss of reactant gases.

3,615,843

METHOD OF CHARGING A METAL-AIR CELL

Paul J. Moran, Ballston Lake, N.Y., assignor to General Electric Company

Filed Sept. 3, 1968, Ser. No. 756,795
Int. Cl. H01m *29/04*
U.S. Cl. 136—86 **1 Claim**

A method of charging a secondary metal-air cell includes providing a composite laminar gas diffusion cathode which as a porous, electrically conductive sheet in electrical contact with the substrate of the cathode, the sheet having a lower oxygen overvoltage than the cathode substrate, positioning the cathode with the sheet facing the anode, and applying a charging current across the electrodes whereby oxygen evolution during charging occurs substantially only at the porous sheet.

3,615,844

METHOD OF OPERATING A BATTERY HAVING CONSUMABLE ANODE MATERIAL

Harold H. Spengler, Waukesha, Wis., assignor to Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

Filed Oct. 9, 1968, Ser. No. 766,130
Int. Cl. H01m *27/00, 33/00*
U.S. Cl. 136—86 A **2 Claims**

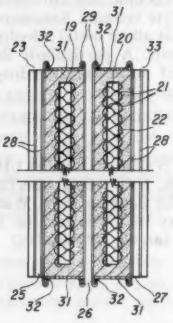
A method is disclosed for enhancing the energy capacity and extending the period of useful life of a battery or cell of a type, such as a zinc-air cell, wherein an anode comprises a stable substrate coated or plated with a deposit material which during discharge is at least partially soluble in an electrolyte contained in the cell. The method includes the step of completely discharging the cell to strip the deposit (e.g., the zinc, in a zinc-air cell) from its support structure after about five charge-discharge cycles, to provide clean support structure for accepting the deposit during charging with minimized formation of elongated dendritic forms of the deposit which if permitted to grow and regrow on unclean surfaces of the substrate, tend to span space between electrodes and short circuit such a cell.

3,615,845

FUEL CELL ELECTROLYTE CONTROL

Foster L. Gray, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 31, 1968, Ser. No. 788,211
Int. Cl. H01m *27/20*
U.S. Cl. 136—86 **2 Claims**



An electrolyte control system for a fuel cell which has an anode and a cathode spaced by an electrolyte carrying matrix wherein porous capillary conduits communicate from an electrolyte reservoir to points uniformly along the matrix. For example, the porous capillary conduits can be positioned uniformly along the matrix adjacent the cathode and thereby supply electrolyte directly to the cathode, and to the anode and matrix at whatever rate the matrix will absorb the electrolyte.

3,615,846

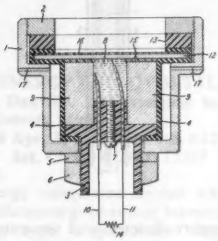
FLUID EXPANSION BLADDER

Robert E. Plank, Willow Grove, Pa., assignor to General Electric Company

Filed Jan. 2, 1969, Ser. No. 788,556
Int. Cl. H01m *29/02*
U.S. Cl. 136—86 A **7 Claims**

An expandable bladder for permitting expansion of a fluid within the bladder due to temperature, pressure or chemical changes without damage to fragile members adjacent the

fluid. The thin, flexible, fluidtight bladder is disposed about a pool of liquid having gas dissolved therein and a fragile member located adjacent thereto. When fluid expansion



occurs the bladder member is displaced by the gas or liquid to provide accommodation therefor, thus preventing any substantial fluid pressure force from acting on the fragile member.

3,615,847

MANUFACTURE OF ELECTRODES FOR FUEL CELLS

Claude Vanleugenhaghe, Avenue Lancewseert n°20, Brussels 15, Belgium

Filed Feb. 4, 1969, Ser. No. 796,504

Claims priority, application Great Britain, Feb. 5, 1968, 5623/68

Int. Cl. H01m *27/04, 13/04*

U.S. Cl. 136—86 E **7 Claims**

The electrochemical performance of a fuel cell electrode consisting of a laminated or compressed mixture of carbon, a catalyst and a fluorocarbon polymer as binder is improved by contacting the electrode with a metal reacting with the fluorocarbon polymer and selected from the class of the alkali metals and the alkaline earth metals at a temperature sufficient to cause reaction between the metal and the polymer, the reaction being confined to the surface without degrading the bulk of the polymer.

3,615,848

THERMAL CONTROL FOR FUEL CELL MODULE

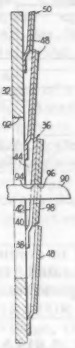
Donald D. Sibenhorn, Menomonee Falls, Wis., assignor to Isotopes, Inc., Westwood, N.J.

Filed Feb. 27, 1969, Ser. No. 802,769

Int. Cl. Holm *27/02*

U.S. Cl. 136—86 B **9 Claims**

An assembly of fuel cells or like source of electrical power having mounted on an outer surface of the fuel cell module interleaved sets of high and low thermal emissivity surfaces, with one set of surfaces being stationary and the other set of surfaces being movable. Means are provided for sensing the thermal condition of the fuel cell module and for moving one set of surfaces relative to the other set of surfaces to vary the



thermal radiation from the fuel cell module and thus to control the temperature of the fuel cell module.

3,615,849

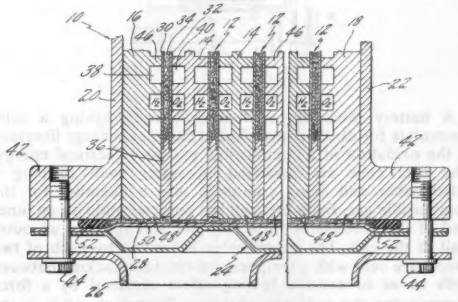
FUEL CELL DIELECTRIC HEAT TRANSFER MEDIUM

Andrew Hall, Wapping, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed June 18, 1969, Ser. No. 834,423

Int. Cl. H01m *27/12*

U.S. Cl. 136—86 **5 Claims**



A device is disclosed whereby a heat transfer medium is inserted between a fuel cell stack and an attached boiler to improve the heat transfer from the cell stack to the boiler. The medium consists essentially of a porous nonconductive matrix saturated with a dielectric grease.

3,615,850

SYSTEM AND PROCESS EMPLOYING A REFORMABLE FUEL TO GENERATE ELECTRICAL ENERGY

Paul Chludzinski, Lynn, and John Ward Harrison, Manchester, both of Mass., assignors to General Electric Company

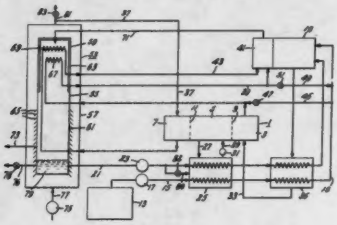
Continuation of application Ser. No. 546,326, Apr. 29, 1966, now abandoned. This application Mar. 10, 1969, Ser. No. 845,923

Int. Cl. H01m *27/14*

U.S. Cl. 136—86 **12 Claims**

A system for generating electrical energy reacts fuel and water to form hydrogen which is delivered to a fuel cell in an

amount exceeding its requirements, the surplus hydrogen being burned to maintain the endothermic fuel-water reaction. Product water from the burning and fuel cell



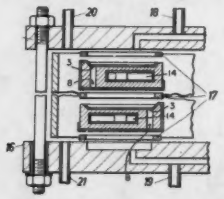
operations is recovered to continue the fuel-water reaction, which water is preheated by the electrolyte, which advantageously may be phosphoric acid.

3,615,851

BATTERY WITH FUEL CELLS OF SOLID ELECTROLYTE

Hans Hermann Eysel, am Kirchwald, Germany, assignor to Brown, Boveri & Cie Aktiengesellschaft, Kallstadter Str. 1, Germany

Filed Sept. 25, 1969, Ser. No. 860,900
Claims priority, application Germany, Nov. 20, 1968, P 18 09 878.7
Int. Cl. H01m *27/00*
U.S. Cl. 136—86 R **5 Claims**



A battery made up of fuel cells each having a solid electrolyte for direct conversion of chemical energy liberated in the oxidation of a combustible gas into electrical energy. The fuel cells are arranged in series each forming a subchamber and being combined into a chamber for the combustible gas. Each fuel cell has one electrode on an inner wall of the subchamber and its other electrode on an outer wall of the cell. The subchamber is formed by each of two successive cells with a temperature-resistant packing between cells so as to exert a sealing effect obtained by a force compressing the cells and packings. Each fuel cell is in the form of a portion of a cylinder made in one or two pieces having a cylindrical periphery and faces perpendicular to its axis, at least one face being recessed and the subchamber formed by putting two successive cells together.

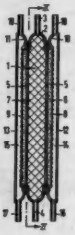
3,615,852

FUEL CELL

Johann Gehring, Erlangen, and Karl Strasser, Nurnberg, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Oct. 30, 1969, Ser. No. 872,706
Claims priority, application Germany, Nov. 2, 1968, P 18 06 794.2
Int. Cl. H01m *27/02*
U.S. Cl. 136—86 R **10 Claims**

Fuel cell includes a pair of electrodes spaced from one another, a porous support skeleton having electron-nonconductive cover layers at opposite sides thereof disposed in the space between the electrodes and containing fluid electrolyte, a metal profile frame carrying the support skeleton and provided with at least one supply duct and one discharge duct for electrolyte, and an elastic metal frame carrying each of the electrodes and located adjacent the



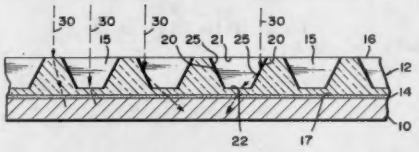
frame for the support skeleton and separated therefrom by the respective electrically nonconductive cover layer, the frame for the electrodes being provided with respective supply and discharge ducts for fuel cell reactants.

3,615,853

SOLAR CELL PANELS WITH LIGHT-TRANSMITTING PLATE

Thomas O. Paine, Administrator of the National Aeronautics and Space Administration with respect to an invention of; John V. Goldsmith, Montrose, Calif., and Geza P. Rolik, LaCanada, Calif.

Filed Jan. 28, 1970, Ser. No. 6,616
Int. Cl. H01l *15/02*
U.S. Cl. 136—89 **7 Claims**



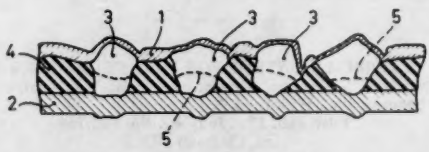
A solar cell panel with a cover plate which defines a plurality of apertures with light-reflective surfaces. The shapes of the apertures and the spacings between them are chosen to vary the illumination level of the cells as a function of the degree of inclination of the plate with respect to the normal light direction.

3,615,854

ELECTRODE SYSTEM EMPLOYING OPTICALLY ACTIVE GRAINS

Albert Christiaan Aten, Emmasingel, Eindhoven, Netherlands, assignor to U. S. Philips Corporation, New York, N.Y.

Filed July 25, 1968, Ser. No. 747,634
Claims priority, application Netherlands, Aug. 10, 1967, 6711002
Int. Cl. H01l *15/02*
U.S. Cl. 136—89 **7 Claims**



A radiation-responsive device, for example a radiation detector, photocell or photoresistor comprising a monolayer of electrically active grains embedded in a binder and a

radiation-permeable electrode covering one side of the grains. The grains are divided into two groups each of which has a different photosensitivity or characteristic. Grains of one group are doped with one dopant to produce a grain which has a given photocharacteristic or resistance as a function of incident radiation while grains of the other group are doped with a different dopant so as to have a different photocharacteristic of resistance as a function of the incident radiation.

3,615,855

RADIANT ENERGY PHOTOVOLTALIC DEVICE

Allen H. Smith, Danville, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 3, 1969, Ser. No. 812,976
Int. Cl. H01l 7/44, 15/02
U.S. Cl. 136—89 9 Claims

A radiant energy conversion device which comprises a silicon slice, a silicon-to-germanium transitional region of a first conductivity type, a germanium layer of a second conductivity type and a pair of ohmic contacts. One form of the device includes an epitaxial deposition of a P-type transitional region onto a low resistivity P-type silicon slice. An N-type germanium layer is then epitaxially deposited on the transitional region. The transitional region contains an electrostatic drift field which improves the collection of charged particles. A current collecting grid is bonded to the silicon slice and a conductive support is bonded to the germanium layer.

3,615,856

GERMANIUM-TIN ALLOY INFRARED DETECTOR

Henry Stern Sommers, Jr., Princeton, N.J., assignor to RCA Corporation

Filed Apr. 14, 1969, Ser. No. 815,666
Int. Cl. H01l 15/02
U.S. Cl. 136—89 1 Claim

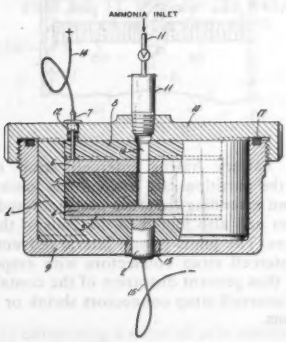
An infrared radiation detector useful at room temperature includes an epitaxial, germanium-tin alloy grown by liquid phase epitaxy with a concentration of tin greater than 2.5 atomic percent.

3,615,857

ELECTRIC CURRENT-PRODUCING CELL AND GENERATION OF CURRENT WITH SAME

George J. Methlie, II, Centre Square, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 29, 1967, Ser. No. 694,481
Int. Cl. H01m 17/04
U.S. Cl. 136—90 11 Claims



An electric current-producing cell system based on the use of anhydrous liquid ammonia as the electrolyte solvent employs, as depolarizing cathode, a mercurous salt which disproportionates, in the presence of ammonia, into the corresponding ammoniated mercuric salt and metallic mercury, the resulting intimate mixture of metallic mercury and ammoniated mercuric salt having very low internal resistance thereby permitting, in the generation of current, rapid drawing of current and high initial voltage.

3,615,858

BATTERY COMPRISING POSITIVE ELECTRODE COMPOSED OF PRINCIPAL AND SECONDARY ACTIVE MATERIAL WHEREIN SOLE ELECTRONIC PATH IS THROUGH THE SECONDARY ACTIVE MATERIAL

Luis Soto-Krebs, Santiago, Chile, assignor to ESB Incorporated, Philadelphia, Pa.

Filed Apr. 6, 1965, Ser. No. 445,904
Int. Cl. H01m 21/00, 17/00
U.S. Cl. 136—107 5 Claims

A battery electrode composed of a principal active material and a secondary active material and a method of discharging the same so as to achieve the discharge potential characteristic of the secondary active material wherein the sole electronic path for discharge of the principal active material is through the secondary active material. The discharge product of the secondary active material must be readily oxidized by the principal active material.

3,615,859

LECLANCHE DRY CELL WITH THICK WALL PASTE SEPARATOR

Brooke Schumm, Jr., Bay Village, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed June 5, 1969, Ser. No. 830,657
Int. Cl. H01m 21/00
U.S. Cl. 136—107 3 Claims

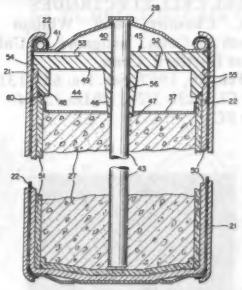
A substantial reduction in the formation and movement of spew in a Leclanche dry cell is obtained by the provision of a thick wall gelatinous electrolyte past separator interposed between the consumable zinc anode and the cathode mix cake without seriously reducing the service life of the cell.

3,615,860

DRY CELL CONSTRUCTION HAVING A ONE PIECE PLASTIC CLOSURE

Mark J. Terlecke, Madison, Wis., assignor to ESB Incorporated

Continuation-in-part of application Ser. No. 772,774, Nov. 1, 1968. This application Dec. 9, 1969, Ser. No. 883,426
Int. Cl. H01n 21/06
U.S. Cl. 136—107 6 Claims

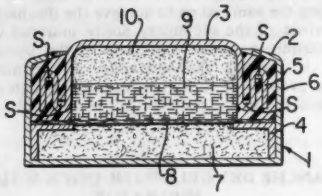


A dry cell construction having a one-piece plastic closure covering the open end of the negative electrode can which contains a depolarizer mix and a current collector centrally imbedded in the depolarizer mix. The plastic closure rests on the top edge of the negative electrode can and has a tubular projection extending from the bottom thereof through which the current collector passes. The tubular projection covers the current collector throughout an airspace located above the depolarizer mix. The plastic closure contains at least one venthole extending from its top surface into contact with the airspace above the depolarizer mix and at least one groove in the top surface of the closure extending from the outer edge of the closure into contact with the airspace between the terminal cap on top of the current collector and the plastic closure. It is preferred that the plastic closure have a plurality of ventholes and grooves which are offset from each other. The cell construction of this invention is particularly adapted for rechargeable dry cells which utilize a depolarizer mix containing an azodicarbonamide depolarizer material.

3,615,861
SEALING ARRANGEMENT FOR BUTTON-TYPE ELECTROCHEMICAL CELLS

Michel Braem, Saint-Benoit, France, assignor to Societe Des Accumulateurs Fixes Et De Traction (Societe Anonyme), Romainville, France

Filed Mar. 19, 1970, Ser. No. 21,049
Claims priority, application France, Apr. 22, 1969, 69/12687
Int. Cl. H01m *21/00, 1/02*
U.S. Cl. 136—111 6 Claims

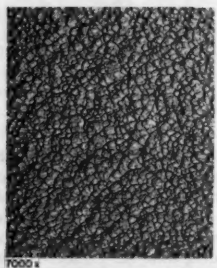


Arrangement for effectively sealing electromechanical cells of the so-called button-type embodying a pair of interfitting metal cups electrically insulated from each other by an annular gasket of molded insulating material, one of the cups constituting the cover having its rim portion folded upon itself at least twice in zigzag fashion or spiralwise surrounding which the said gasket is preferably molded in situ so that the material thereof penetrates at least partially spaces between the folds of the rim, leaving some free spaces at bottoms of the folds that serve as retention chambers for electrolyte inside the cell to preclude its leakage from the cells. The folds provide tortuous engaging surfaces with the gasket that enhance leakage prevention. The rim of the other cup is bent over the outer surface of the gasket to compress it sufficiently to provide at least one effective zone of elastic compression between surfaces of the first cup and gasket.

3,615,862
FUEL CELL ELECTRODES

Hilton A. Roth, Cheshire, and William R. Lasko, Glastonbury, both of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Feb. 20, 1967, Ser. No. 617,131
Int. Cl. C23b *5/24;* H01m *13/04*
U.S. Cl. 136—120 FC 14 Claims



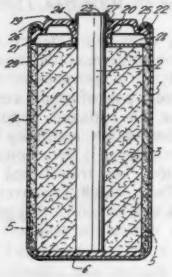
Pd-Ag ELECTRODE ACTIVATED BY ELECTRODEPOSITION

Activated fuel cell electrodes are prepared by electrodeposition of a noble metal catalyst on a solid foil or porous electrode substrate. The electrodeposition is effected from an alkali metal hydroxide solution, preferably molten alkali metal hydroxide. The electrolysis is generally carried out at temperatures of about 300° to 500° F. at current densities of about 5 to 150 ma./cm.^{2} by passing a direct electrical current to the electrode substrate through the alkali metal hydroxide electrolyte solution. Palladium-black is a preferred noble metal catalyst, and palladium or palladium-silver alloy foils and porous sintered nickel structures are the preferred electrode substrates.

3,615,863
ELECTRIC DRY CELLS

Ching-Koon Pun, and Ching-Chau Poon, both of P.O. Box 5538, Kowloon, Hong Kong, Great Britain

Filed July 16, 1969, Ser. No. 842,119
Claims priority, application Great Britain, July 24, 1968, 35368/68
Int. Cl. H01m *3/04*
U.S. Cl. 136—131 14 Claims

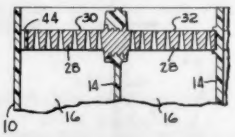


An electric dry cell in which the depolarizing dolly is centralized in the cup electrode, and spaced from its wall, by spacing means incorporating one or more elongate moulded plastics spacing members shaped so as to make only line or point contact with the cup electrode wall so as to minimize obstruction of the passage of current between the electrolyte and the cup electrode.

3,615,864
BATTERY HAVING JOINT FOR PREVENTING CONTAINER DISTORTION

James W. Consolloy, Pennington, N.J., assignor to ESB Incorporated

Filed Dec. 9, 1969, Ser. No. 883,552
Int. Cl. H01m *5/00, 1/00*
U.S. Cl. 136—134 2 Claims



A multicell battery having intercell strap connectors around which the partitions are molded has joints integrally molded with and extending from the partitions and end walls of the container and also joined to the ends of the intercell strap connectors. The joints permit lateral movement of the ends of the intercell strap connectors with respect to the container, and thus prevent distortion of the container as the container and intercell strap connectors shrink or expand by unequal amounts.

3,615,865
BATTERY SEPARATOR

Thomas J. Wetherell, New York, N.Y., assignor to High Energy Processing Corporation, New Bedford, Mass.

Filed Jan. 24, 1969, Ser. No. 793,894
Int. Cl. H01m *3/00*
U.S. Cl. 136—146 4 Claims

A battery separator for alkaline storage batteries of the nonwoven fiber mat type; the fiber mat being impregnated

with a polymeric binder and a monomeric wetting agent, the thus impregnated mat being subjected to irradiation to form a cross-linked unitary structure.

3,615,866

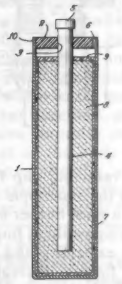
METHOD OF SEALING MAGNESIUM CELLS

Milton E. Wilke, Freeport, Ill., and Howard J. Strauss, Beachwood, Ohio, assignors to Clevite Corporation, Cleveland, Ohio

Continuation-in-part of application Ser. No. 704,001, Feb. 8, 1968, now abandoned. This application Feb. 24, 1970, Ser. No. 13,301

Int. Cl. H01m *1/02*

U.S. Cl. 136—175 1 Claim



In sealing a dry cell having an anode in the form of a cylindrical magnesium container and a sealing disk of a plastic material having its periphery in sealing engagement with the open top portion of the magnesium container, a restricted aperture is provided in the sealing disk of a size sufficient to permit gases formed in the cell immediately after assembly to escape, yet sufficiently small to prevent the venting of excessive moisture. The aperture is closed to seal the cell after the initial gas formation period by reducing the radius of the open top of the cell and the disk therein sufficiently to close the aperture and seal the cell.

3,615,867

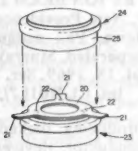
METHOD OF ASSEMBLING A BATTERY WITH INTERCELL CONNECTORS

Everett R. Cich, and Robert C. Ivey, both of Madison, Wis., assignors to ESB Incorporated

Filed July 11, 1969, Ser. No. 841,016

Int. Cl. H01m *5/00, 13/10*

U.S. Cl. 136—175 2 Claims



A battery comprising a series of cells stacked one upon the other is disclosed wherein the cells are connected by intercell connectors which assure good electrical contact between cells and proper alignment of each cell with respect to the next. The intercell connector comprises a flat section with a series of radial extensions or ears projecting beyond the edge of the flat section. In assembly the flat section is welded to one electrode of one cell and another cell is then stacked on top with the ears of the interconnector being bent upwards and welded to the other cell to interconnect the cells and accurately align them with respect to each other.

3,615,868

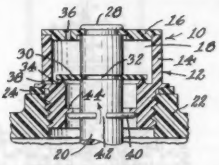
BATTERY CAP ASSEMBLY

Robert Richard Melone, Des Plaines, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Feb. 20, 1970, Ser. No. 13,010

Int. Cl. H01m *1/06*

U.S. Cl. 136—178 10 Claims



The present invention relates generally to combined battery cap and liquid level indicators and more particularly to such assemblies wherein the liquid level indicator comprises an elongate or rodlike body of light transmitting material. The embodiment of the invention disclosed herein includes a centrally apertured cap member having an annular valve seat with the elongate indicator member supported by and extending through the cap member. The outer extremity of the rodlike member provides a light receiving surface and the lower extremity is adapted for immersion within a battery fluid. An axially deflectable annular valve member is secured to and radiates from the indicator periphery, the valve member being normally biased into sealing engagement with the annular seat and arranged to preclude leakage of liquid through the assembly into an associated battery.

3,615,869

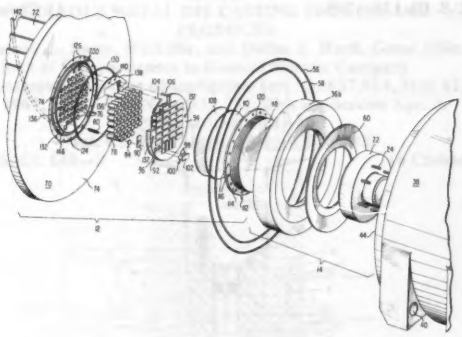
RADIOISOTOPE THERMOELECTRIC GENERATOR

Theodore R. Barker, Pasadena; Wilfred L. Kershaw, Towson; George S. Stivers, Baltimore, and Jack L. Thomas, Baltimore, all of Md., assignors to Teledyne, Inc., Los Angeles, Calif.

Filed July 26, 1965, Ser. No. 474,547

Int. Cl. H01v *1/30*; G21h *1/06*

U.S. Cl. 136—202 22 Claims



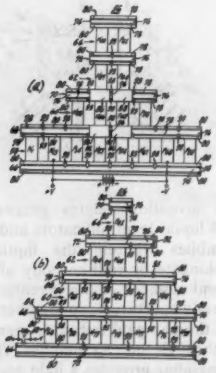
An improved thermoelectric generator assembly including a heat sink member adapted to dissipate heat directly to the environment and having a thermoelectric conversion system removably connected thereto utilizing a thin cover having bellows-type sidewalls. The thermoelectric elements are positioned within perforations formed in a platelike insulating disk. The heat sink member is removably connected to a cylindrical container, which may be cup shaped, and which is formed of a radiation shielding material. A shielded radioisotopic fuel capsule is positioned within the container and separated therefrom by thermal insulation in solid configuration retaining form.

3,615,870

THERMOELEMENT ARRAY CONNECTING APPARATUS

Marvin Snyder Crouthamel, Pennsauken, N.J., assignor to RCA Corporation

Filed Sept. 4, 1968, Ser. No. 757,398
Int. Cl. H01v 1/30
U.S. Cl. 136—204 5 Claims



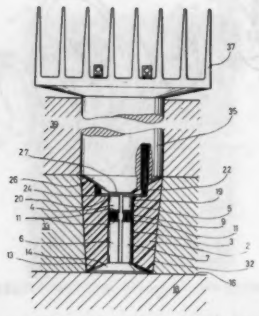
To construct a thermoelement array connecting apparatus in a thermoelectric cooling module, a soft copper layer is electroplated over a metallized wafer of beryllia. Narrow grooves are cut through the copper layer and metallized layer and into the beryllia to form small pads to which thermoelements are attached. Thereafter certain of the pads are recoupled together to form the proper array.

3,615,871

THERMOELECTRIC DEVICE

Veit Merges, Munich, and Paul Zahn, Ottobrunn, both of Germany, assignors to Bolkow Gesellschaft mit beschrankter Haftung, Ottobrunn bei Munich, Germany

Filed Jan. 9, 1968, Ser. No. 696,642
Claims priority, application Germany, Jan. 12, 1967, B90707
Int. Cl. H01v 1/32
U.S. Cl. 136—205 11 Claims



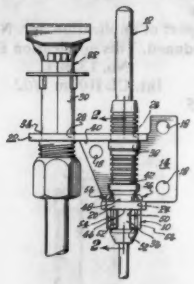
A thermoelectric device including a semiconductor thermocouple element having *p* and *n*-conductive legs. Each of the thermoconductive legs consists of at least two thermally and electrically series connected parts of different material. The electric and thermal connection between the parts of the legs comprises bodies of good thermoconductivity, preferably silver threads twisted to multistranded cable pieces, which are arranged in a slackened condition.

3,615,872

SUPPORTING AND RETAINING MEANS FOR TEMPERATURE SENSING MEANS

Henry C. Braucksiek, Buena Park, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed May 9, 1969, Ser. No. 823,263
Int. Cl. F23n 5/10
U.S. Cl. 136—217 1 Claim



A supporting and retaining clip for placement upon the tubular extremity of a thermocouple or thermopile to mount such extremity within a pilot burner bracket opening, the clip including portions having resilient fingers which flex inwardly to enable the tubular extremity and clip to be inserted into the opening, which fingers thereafter flex outwardly to engage the margin of the opening and constrain the clip against accidental withdrawal from the opening, the clip being characterized by portions separate from said fingers for engagement of spaced abutments on the tubular extremity to thereby constrain the clip against movement relative to said tubular extremity.

3,615,873

METHOD OF STABILIZING MOS DEVICES

James A. Sluss, Jr., Hopkinton, and Derek Cregeen, Concord, both of N.H., assignors to Sprague Electric Company, North Adams, Mass.

Filed June 3, 1969, Ser. No. 830,156
Int. Cl. H01l 7/34
U.S. Cl. 148—1.5 5 Claims

The electrical properties of an MOS device are improved by subjecting the device, after the oxidation procedure is completed, to an annealing operation in an inert gas ambient. The annealing process is terminated by rapidly removing the device from the annealing ambient and placing it within a lower temperature ambient.

3,615,874

METHOD FOR PRODUCING PASSIVATED PN JUNCTIONS BY ION BEAM IMPLANTATION

Martin P. Lepselter, New Providence, N.J., and Herbert A. Waggener, Allentown, Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 15, 1969, Ser. No. 857,936
Int. Cl. H01l 7/54
U.S. Cl. 148—1.5 7 Claims

A method for producing tucked-under, passivated PN junctions in semiconductor devices by ion implantation through a layered mask. The mask comprises a first relatively thin dielectric layer and a conductive layer thereover. An aperture is formed in the conductive layer, and the structure is subjected to a beam of dopant ions having energy sufficient to penetrate the dielectric layer but insufficient to penetrate the combined layers. In this fashion a PN junction is formed in the semiconductor body underneath the aperture in the conductive layer. Then the conductive layer is caused to become thicker, e.g., by electroplating, which also causes the aperture in the second layer to become smaller in lateral dimension. Then, using the conductive layer as a mask, the portion of the dielectric layer exposed through the aperture is selectively removed, e.g., by backsputtering. In this manner there is exposed a portion of the surface which is smaller than the implanted zone.

3,615,875

METHOD FOR FABRICATING SEMICONDUCTOR DEVICES BY ION IMPLANTATION

Todahisa Morita, Mitaka-shi; Takashi Tokuyama, Hoya-shi; Takashi Tsuchimoto, Kodaira-shi; Takao Miyazaki, Hachioji-shi; Shigeru Nishimatsu, Tokyo; Takahide Ikeda, Kokubunji-shi; Hisumi Sano, Tokyo, and Masatada Horiuchi, Koganei-shi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sept. 29, 1969, Ser. No. 861,823
Claims priority, application Japan, Sept. 30, 1968, 40/70136
Int. Cl. H01l 7/54
U.S. Cl. 148—1.5 5 Claims

A semiconductor body acting as a collector is directed at a predetermined surface area by an inert ion beam from such a direction as not to produce a channeling effect in the body, whereby obtaining an amorphous surface region thereat, then directed at a larger surface area including said predetermined surface area by an active impurity ion beam of the conductivity type opposite to said body from a direction producing the channeling effect in the body, thereby obtaining a base region in the semiconductor body with a PN junction therebetween which has a partial projection in its bottom part, and further directed at said predetermined surface area by an active impurity ion beam of the same conductivity type as that of the body from the channeling-effect-providing direction, thereby obtaining an emitter region, and finally heat-treating, so that a transistor without defects due to the emitter dip effect is obtained.

3,615,876

SEMICONDUCTING FERROELECTRIC TRANSDUCERS

Roger A. Cowley, Deep River, Ontario, Canada; Gerald Dolling, Oak Ridge National Laboratory, Oak Ridge, Tenn.; William W. Cochran; Godfrey S. Pawley, Edinburgh, Scotland, and Issai Lefkowitz, Princeton, N.J., assignors to The United States of America as represented by the Secretary of the Army

Division of Ser. No. 665,208, Aug. 30, 1967, Pat. No. 3,514,677.
Filed Sept. 16, 1969, Ser. No. 870,755
Claims priority, application Canada, Sept. 14, 1966, 970,302
Int. Cl. H01l 7/62
U.S. Cl. 148—1.5 4 Claims

New ferroelectric semiconductor materials made of germanium-telluride or an alloy or solid solution of germanium-telluride and tin-telluride, for example, with means for doping said materials to provide regions of differing carrier density, one of said regions having an enhanced piezosensitivity, and methods for manufacturing said semiconductor materials.

3,615,877

PHOTOVOLTAIC CELL AND ITS METHOD OF MANUFACTURING

Kazuo Yamashita, 12-3, Tachibanacho-1-Chome, Toyonaka-shi, Japan

Filed Dec. 30, 1969, Ser. No. 889,285
Claims priority, application Japan, Dec. 2, 1965, Sept. 25, 1965, June 22, 1966 40/75452, 40/59,271, 41/41,147
Int. Cl. H01l 7/62
U.S. Cl. 148—1.5 4 Claims

A method of making a photovoltaic cell employing powdered polycrystalline photoelectric material, the method comprising, forming at least one electrode on a photoelectric layer and electroplating a P-type determining metal, such as copper, on said electrode at least partially through the photoelectric layer whereby the portion of said photoelectric layer subjected to said electroplating process is converted to P-type by the metal ions proceeding to the electrode, forming thereby a PN junction therearound, and a photovoltaic cell thus formed.

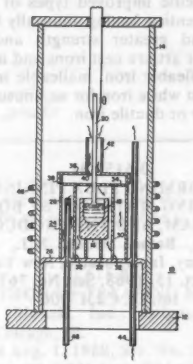
3,615,878

PROCESS FOR THE THERMAL TREATMENT OF A SEMICONDUCTOR MATERIAL HAVING A VOLATILE COMPONENT

Hung Chi Chang, Monroeville, Pa., and Ting Li Chu, Dallas, Tex., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 701,967, Jan. 31, 1968, Pat. No. 3,556,732.
Filed Jan. 30, 1970, Ser. No. 7,186
Int. Cl. B01j 17/02
U.S. Cl. 148—1.6 6 Claims

A semiconductor material having a volatile component is thermally treated in an ambient formed by a gaseous mixture



which constantly maintains the stoichiometry of the semiconductor material during the thermal treatment.

3,615,879

CENTRIFUGAL MOLD FOR THE CASTING OF LIQUID METAL AND THE PROCESS FOR PRODUCING SAID CENTRIFUGAL MOLD

Eugene Herzog, Nancy, France, assignor to Centre De Recherches De Pont-A-Monsson, Pont-A-Monsson, France

Filed Aug. 1, 1968, Ser. No. 749,411
Claims priority, application France, Aug. 8, 1967, 117222
Int. Cl. C21d 9/08; C22c 39/26
U.S. Cl. 148—2 10 Claims

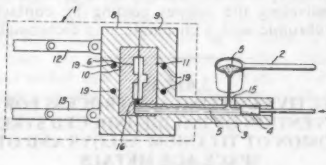
Centrifugal mold for casting liquid steel. The centrifugal mold is of low-alloy steel selected from the range of air-hardenable steels and having 0.15–0.30 percent of carbon and additions not exceeding 5 percent of the total. This steel has, throughout the thickness of the centrifugal mold, a regular and uniform structure in which at least 60 percent of the carbon is fixed in the form of chromium-and manganese-saturated cementite.

3,615,880

FERROUS METAL DIE CASTING PROCESS AND PRODUCTS

Ronald L. Barto, Wickliffe, and Dallas T. Hurd, Gates Mills, both of Ohio, assignors to General Electric Company

Continuation-in-part of application Ser. No. 637,814, May 11, 1967, now Patent No. 3,532,561. This application Apr. 3, 1968, Ser. No. 718,640
Int. Cl. B22d 15/00, 17/00; C21d 5/00
U.S. Cl. 148—3 16 Claims



A process for producing ferrous metal articles by pressure injection die casting at high temperature in molds lined with or having inserts of refractory metals of high thermal conductivity, particularly tungsten, molybdenum or their alloys, followed by short time heat treatments to produce desirable metallurgical structures. Due to the high rate of heat extraction and due to the turbulent stirring of the liquid metal by the injection process, even with the molds operating at temperatures elevated enough to prevent premature freezing and poor cast surfaces, the refractory metal of the mold produces a supercooling or quenching effect resulting

in uniform, extremely fine as-cast grain structures which are unusually susceptible to short and more economical heat treatment to beneficially modify the structures and properties of the articles. Specific improved types of products of the processes of the invention having unusually fine and uniform grain structure, and greater strength and ductility than available in the prior art are cast irons and include: gray cast iron encased in malleable iron, malleable iron produced by heat treating die cast white iron for an unusually short period of time, and nodular or ductile iron.

3,615,881

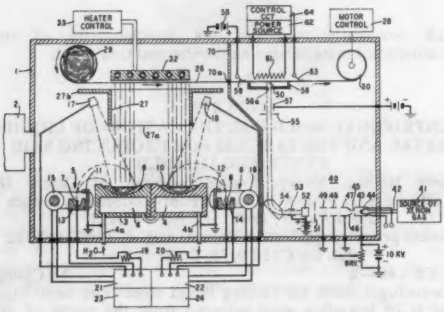
METHOD OF FORMING FLUX PINNING SITES IN A SUPERCONDUCTING MATERIAL BY BOMBARDMENT WITH AN ION BEAM, AND THE PRODUCTS THEREOF

William J. Greene, Bound Brook, N.J., assignor to Air Reduction Company, Incorporated, New York, N.Y.

Filed Oct. 15, 1968, Ser. No. 767,765

Int. Cl. C23f 7/00

U.S. Cl. 148—4 **9 Claims**



This relates in general to superconductive materials, and more particularly to vacuum-deposited superconductive films having improved characteristics.

3,615,882

METHOD OF MAKING A MIRROR

Kentaro Nagano; Koji Nomaki; Yoshihito Saoyama, and Takashi Azeyanagi, all of Yokohama-shi, Japan, assignors to Asahi Glass Co., Ltd., Chiyoda-ku, Tokoyo, Japan

Filed Dec. 23, 1968, Ser. No. 786,419

Claims priority, application Japan, Aug. 27, 1968, 43/60880

Int. Cl. C23f 7/26

U.S. Cl. 148—6.2 **6 Claims**

A mirror is made by depositing silver on a glass plate by chemical reduction of silver nitrate, covering the silver film with a protective copper layer deposited from a copper sulfate solution by means of a finely divided less noble metal, and by passivating the copper coating by contact with a solution of chromic acid, a chromate, or a dichromate.

3,615,883

PROTECTIVE COATING AND PROCESS FOR THE PREVENTION OF HALIDE-INDUCED STRESS CORROSION OT TITANIUM ALLOYS AND OTHER SPACE AGE METALS

Eugene L. Giachino, Glendale, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Continuation-in-part of application Ser. No. 638,764, May 16, 1967, now abandoned. This application Dec. 10, 1969, Ser. No. 884,044

Int. Cl. C23f 7/26, 9/00

U.S. Cl. 148—6.2 **3 Claims**

Addition of small amounts of the nitrate ions, particularly sodium nitrate, to water solutions affords protection against halide-induced stress corrosion cracking. The nitrate may be prepared in a stable base water solution or dispersed in a suitable resin. The solution may be applied by dipping, brushing, spraying, etc.

3,615,884

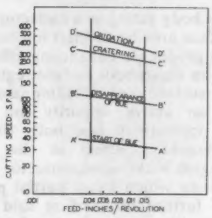
METHOD OF INCREASING THE LIFE OF CARBIDE CUTTING TOOLS

James D. Collins, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 26, 1970, Ser. No. 5,602

Int. Cl. C23f 7/08

U.S. Cl. 148—6.3 **3 Claims**



A method of increasing the life and cutting characteristics of a carbide cutting tool is disclosed wherein the tool is heated in the range of 750° to 1600° F. in an oxidizing environment for a time sufficient to produce an oxide layer on the tool having a thickness of at least 0.0002 inch. The oxide layer prevents instantaneous edge buildup resulting in improved tool life at speed and feed ranges at which built-up edge is the failure mode.

3,615,885

FORMING UNIFORM THICK OXIDE LAYER OF MATERIAL

Robert Douglas Watson, 9 Cabot Pl. P.O. Box 86, Deep River, Ontario; Anton Sawatzky, Pinawa, Manitoba; Norman Hall Russell, Pine Point, Deep River, Ontario, and Raymond Orest Sochaski, Pinawa, Manitoba, all of Canada

Filed July 17, 1967, Ser. No. 653,721

Claims priority, application Canada, Sept. 19, 1966, 970,698

Int. Cl. C23c 11/00

U.S. Cl. 148—6.3 **3 Claims**

Several methods of producing a uniform beige oxide layer on Zircaloy-2 have been developed. The oxidized material has excellent wear resistance and should be useful for parts in rubbing contact in water-lubricated mechanisms operating at temperatures up to 500° F.

The oxidation rate of Zircaloy-2 in air is extremely dependent on the surface texture and the treatment given it. A rough surface produced by machining or grit blasting will assure the formation of a uniform beige post-transition oxide layer. A fine surface produced by grit blasting, polishing, machining or grinding will decrease the oxidation rate and will prevent the formation of a uniform beige post-transition oxide. Deep scratches will increase the oxidation rate, not because of contamination from the scratching surface but apparently because of the surface roughness produced.

3,615,886

CONTROLLED EMITTANCE COATINGS FOR PLATINUM-GROUP METALS

David F. Carroll, Hermosa Beach; Jack L. Blumenthal, Los Angeles, and John R. Ogren, La Palma, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

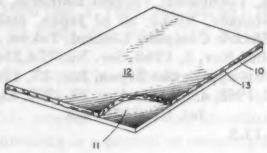
Filed Sept. 21, 1967, Ser. No. 669,561

Int. Cl. C23f 7/02

U.S. Cl. 148—6.3 **9 Claims**

A platinum-group metal or alloy thereof having a controlled emittance coating comprised of an oxide of a metal selected from the group including manganese, nickel, chromium, iron and cobalt, the oxide being diffusion bonded to the metal.

A method of applying a controlled emittance coating to the platinum-group metals and alloys thereof, the coating being applied as a metal, such as nickel, chromium, iron,



manganese or cobalt, and then oxidized and diffusion bonding the oxide to the platinum-group metal or alloy thereof.

3,615,887

METHOD OF PRODUCING ALUMINUM FOIL HAVING A GOLDEN COLOR

Richard E. Ware, Trainer, Pa., assignor to Sun Oil Company, Philadelphia, Pa.

Filed Mar. 26, 1968, Ser. No. 715,985
Int. Cl. C23f 7/24
U.S. Cl. 148—6.3 **5 Claims**

A process for forming a golden-colored aluminum-surfaced article in which an aluminum-surfaced article is contacted with gaseous hydrogen sulfide and thereby creating said golden-colored surface.

3,615,888

CHEMICAL TREATMENT OF METAL

Vernon Paul Wystrach, Wilton, and Francis Clyde Rauch, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Sept. 4, 1969, Ser. No. 855,398
Int. Cl. C23f 7/00
U.S. Cl. 148—6.14 R **8 Claims**

A method for preparing metal surfaces for receipt of a coating such as a paint or adhesive (whereby increased coating adhesion and corrosion resistance is achieved) and the treated metal per se, are disclosed. The method comprises contacting the metal surface with various β-diketones.

3,615,889

CHEMICAL TREATMENT OF METAL

Francis Clyde Rauch, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Sept. 4, 1969, Ser. No. 855,400
Int. Cl. C23f 7/00
U.S. Cl. 148—6.14 R **10 Claims**

A method for preparing metal surfaces for receipt of a coating such as a paint or adhesive (whereby increased coating adhesion and corrosion resistance is achieved) and the treated metal per se, are disclosed. The method comprises contacting the metal surface with various 8-—hydroxy quinoline derivatives.

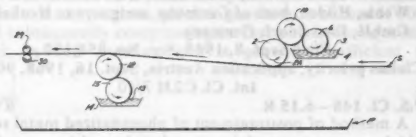
3,615,890

METHOD OF APPLYING PHOSPHATE CONVERSION COATING BY REVERSE ROLLER TECHNIQUE

Richard A. Montella, Ambler, Pa., assignor to Amchem Products, Inc., Ambler, Pa.

Filed Mar. 19, 1968, Ser. No. 714,217
Int. Cl. C23f 7/10
U.S. Cl. 148—6.15 R **10 Claims**

An acidic aqueous coating solution particularly suited for application to ferriferous surfaces by a reverse roller coating process, that is a process wherein the coating solution is applied to a moving metal surface by means of a feed roller which is rotating in a direction opposite to that in which the metal surface is moving, the solution being effective to produce a phosphate conversion coating on the ferriferous surface and containing alkali metal phosphate or phosphoric acid and chlorate, the ingredients being present in relative



amounts which are dependent on the pH of the solution which is within the range of about one to about 3.5.

3,615,891

METHOD OF TREATING METAL

Gene P. Davis, Muncie, Ind., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 1, 1968, Ser. No. 749,266
Int. Cl. C23f 7/10; B21d 7/06
U.S. Cl. 148—6.15 **5 Claims**

A method of treating metal parts comprising the steps of (1) casehardening the exterior surface of the part by carburizing (2) phosphatizing the surface of the carburized part and (3) cold working the exterior surface of the part by shotpeening or other appropriate method.

3,615,892

COMPOSITION AND METHOD FOR BLACK COATING ON METALS

Edward Heinzelman, Jr., Palisades, and Tunis S. Williamson, Ridgewood, both of N.J., assignors to Oakite Products, Inc., Berkeley Heights, N.J.

Filed Oct. 30, 1968, Ser. No. 772,040
Int. Cl. C23f 7/26
U.S. Cl. 148—6.15 **27 Claims**

This invention relates to the production of a black finish on the surfaces of metals that are electropositive to bismuth, for example, ferrous metals, manganese, and the white metals as aluminum, magnesium, cadmium and zinc. The invention more specifically is that of a method of producing a black finish on the surface of such metal electropositive to bismuth by immersing the metal surface in an acidic solution of a trivalent bismuth salt.

3,615,893

PROCESS OF SURFACE TREATMENT OF STEEL

Iwao Matsushima; Tadayuki Ueno, and Nobuyuki Muraoka, all of Kawasaki-shi, Japan, assignors to Nippon Kokan Kabushiki Kaisha

Filed Apr. 1, 1969, Ser. No. 812,429
Int. Cl. C23f 7/10
U.S. Cl. 148—6.15 Z **8 Claims**

To assist the tendency of forming a natural anticorrosive protection rust layer on the surface of weather proof steel, the surface of steel is treated with a solution of phosphate containing from 0.05 to 1 mole of at least two members selected from the group consisting of zinc, calcium, lead, barium and nickel, and from 0.08 to 0.6 mole of an oxidizing acid to form a coating essentially consisting of phosphate.

3,615,894

CHEMICAL TREATMENT OF METAL

Francis Clyde Rauch, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Sept. 4, 1969, Ser. No. 855,399
Int. Cl. C23f 7/08
U.S. Cl. 148—6.15 R **10 Claims**

A method for preparing metal surfaces for receipt of a coating such as a paint or adhesive (whereby increased coating adhesion and corrosion resistance is achieved) and the treated metal per se, are disclosed. The method comprises contacting the metal surface with various phosphinyl derivatives.

3,615,895

POSTTREATMENT OF PHOSPHATIZED METAL SURFACES WITH SILICATES

Helmut Von Freyhold, Dusseldorf-Oberkassel, and Volker Wehle, Hilden, both of Germany, assignors to Henkel & Cie GmbH, Dusseldorf, Germany

Filed Sept. 8, 1969, Ser. No. 856,190
Claims priority, application Austria, Sept. 16, 1968, 9013/68
Int. Cl. C23f 7/10
U.S. Cl. 148—6.15 R 8 Claims

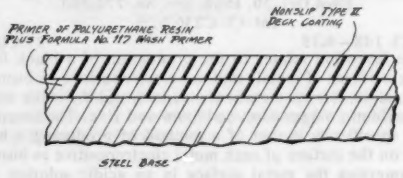
A method of posttreatment of phosphatized metal surfaces which comprises applying to phosphate layers applied to metal surfaces, an aqueous alkali metal silicate solution having a mol proportion of SiO_2 to alkali metal oxide selected from the group consisting of Na_2O and K_2O of from 5 to 1 to 10 to 1 and a SiO_2 concentration of from 0.01 to 1 percent by weight, said alkali metal silicate solution containing a water-soluble quaternary nitrogen compound having at least one nonhydroxylated alkyl group on the quaternary nitrogen atom selected from the group consisting of mono- and polyquaternary nitrogen compounds, said quaternary nitrogen compound being present in a ratio of SiO_2 to quaternary nitrogen compound calculated as quaternary ammonium oxide of from about 35 to 1 to about 1000 to 1, and drying said posttreated phosphatized metal surfaces.

3,615,896

METAL SURFACE PRIMER

Arthur J. Berger, Croton-on-Hudson; Albert W. Cizek, Jr., Valley Stream, and Raymond J. Simeon, Middleburg, all of N.Y., assignors to The United States of America as represented by the Secretary of the Navy

Filed July 31, 1969, Ser. No. 846,418
Int. Cl. C23f 7/10
U.S. Cl. 148—6.16 4 Claims



A deck primer for use with nonslip deck coatings of the chemically cured-resin type comprising a mixture of Formula No. 117 wash primer (as set forth in Military Specification MIL-D-23003(SHIPS) and its Amendment 2) and a specific, moisture-cured, polyurethane resin, in the ratio of 5:4 parts by volume, respectively.

3,615,897

BLACK FILMS FOR METAL SURFACES

Russel S. Banush, Trenton, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Mar. 19, 1969, Ser. No. 808,687
Int. Cl. B44d 5/00
U.S. Cl. 148—6.24 7 Claims

A black, smutlike film, resistant to rub off, and uniform in appearance and thickness, is deposited on a metal surface by contacting the surface with an aqueous acidic solution containing bismuth, hydrogen, nitrate, and sulfate ions. The blackened surface is rendered corrosion resistant by further treatment with a phosphating solution to deposit a phosphate conversion coating thereon.

3,615,898

TORCH CUTTING OF HIGH-TEMPERATURE ALLOYS

Donald L. Coffman, Tarentum, Pa., assignor to Allegheny Ludlum Steel Corporation, Brackenridge, Pa.

Filed Aug. 6, 1968, Ser. No. 750,484
Int. Cl. B23k 7/08
U.S. Cl. 148—9 1 Claim

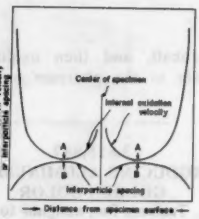
A method of facilitating the torch cutting of heat-resistant alloys whereby additional flame heat is provided by interposing a sheet of titanium between the torch and the alloy.

3,615,899

METHOD OF PRODUCING MATERIALS HAVING A HIGH STRENGTH, A HIGH ELECTRICAL CONDUCTIVITY, AND A HIGH HEAT RESISTANCE

Takao Kimura, Yokohama; Toyoaki Ishibachi, Fujisawa, and Yasushi Watanabe, Nikko, all of Japan, assignors to The Furukawa Electric Company Limited, Tokyo, Japan

Filed Nov. 8, 1968, Ser. No. 774,356
Claims priority, application Japan, Jan. 27, 1968, 43/4576
Aug. 3, 1968, 43/55152; Aug. 29, 1968, 43/61978
Int. Cl. C22f 1/08
U.S. Cl. 148—11.5 9 Claims



Materials having a high strength, a high electrical conductivity and a high heat resistance are produced by directly internally oxidizing a wire or plate of dilute copper alloy consisting of less than 0.2% Be, less than 0.5% mg. less than 1.0% Ti, less than 0.2% Zr, either single-componentwise or multicomponentwise, or therewith less than 0.9% Al and/or less than 0.9% Si with the total addition amount not in excess of 1%, the remainder being copper, at a temperature above 600° C. and at an internal oxidation velocity no smaller than a critical value. Such a production is carried preferably out by coating the wire or plate, with a slurry composed of cuprous oxide, a heat-stable sinter inhibitor, and water or an organic solvent, completely drying said slurry-coated wire or plate and then embedding said slurry-coated wire or plate in a protective agent and then effecting the internal oxidation.

3,615,900

PROCESS FOR PRODUCING ARTICLES WITH APERTURES OR RECESSES OF SMALL CROSS SECTION AND PRODUCT PRODUCED THEREBY

Daeyong Lee, Scotia, N.Y., assignor to General Electric Company

Filed Dec. 30, 1968, Ser. No. 787,838
Int. Cl. C22f 3/00; C23b 3/02
U.S. Cl. 148—11.5 R 5 Claims

A process for preparing a body with apertures of small cross section useful as a filter. An alloy comprised of at least two phases in the solid state is treated to produce at least one phase in a fine form distributed in a matrix comprised of the second or other phases. The resulting treated structure is etched to remove the finely distributed phase to produce apertures or, if desired, recesses.

3,615,901

METHOD OF MAKING A PLASTICALLY SHAPEABLE CATHODE MATERIAL

Gustav K. Medicus, 7521 W. Hyland, Dayton, Ohio

Filed Dec. 1, 1969, Ser. No. 881,265

Int. Cl. C22f *1/10*; B44d *1/18*; H01j *63/02*

U.S. Cl. 148—11.5 R 7 Claims

A plastically shapeable cathode material is prepared by depositing on a nickel substrate a layer of a mixture of nickel or nickel oxide powder and barium, strontium and calcium carbonates; sintering in a neutral or reducing atmosphere the nickel substrate with deposited layer; compressing the sintered material; cold rolling the sintered and compressed material; annealing the resulting cold-rolled material; and repeating the latter two steps until the nickel substrate with deposited layer has a desired thickness.

3,615,902

CORROSION-RESISTANT STEEL

Andrew Lesney, Frazer Township, Allegheny County, Pa., assignor to United States Steel Corporation

Filed Apr. 23, 1969, Ser. No. 818,813

Int. Cl. B32b *15/18*; C21d *7/02*

U.S. Cl. 148—12 5 Claims

A method of producing a ductile, corrosion resistant steel sheet or foil by depositing a coating of chromium, copper, nickel and/or titanium onto the surface of about an 0.080-inch thick hot rolled pickled steel strip prior to any cold rolling, and then cold rolling the coated steel strip to tinplate or foil gauge. The coated steel may then be annealed at a temperature below the Ac_1 temperature to completely recrystallize the steel without causing substantial alloying of the steel and coating metal.

3,615,903

HIGH-PURITY FERROUS MATERIAL AND METHOD OF MAKING IT

D. Cameron Perry, and Stephen W. Zeller, both of Middletown, Ohio, assignors to Armco Steel Corporation, Middletown, Ohio

Filed Oct. 3, 1968, Ser. No. 764,923

Int. Cl. C21d *1/74*

U.S. Cl. 148—12.1 11 Claims

A high-purity ferrous material and method of making it, whereby the ferrous material is hot rolled to sheet or coil thicknesses. Thereafter, the ferrous material is descaled and may be further reduced in thickness by cold rolling when necessary. The hot rolled or hot and cold rolled ferrous material is then coated with any of the annealing separators described below and annealed at a temperature of from about 1,900° F. to about 2,500° F. in an atmosphere of 100 percent hydrogen or a hydrogen bearing atmosphere capable of removing impurities to the desired low levels. When the proper relationships are maintained with respect to initial manganese and sulfur contents, gauge, nature of the annealing separator, dew point of the annealing atmosphere, composition of the annealing atmosphere, annealing temperature and soak time, a product is produced having a composition comparing favorably to or surpassing that of typical electrolytic iron.

3,615,904

METHOD OF IMPROVING NITRIDE-STRENGTHENED STAINLESS STEEL PROPERTIES

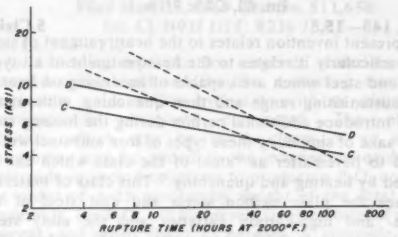
Lynn E. Kindlimann, Natrona Heights, and Alexander B. Greene, New Kensington, both of Pa., assignors to Allegheny Ludlune Steel Corporation, Pittsburgh, Pa.

Filed Feb. 28, 1969, Ser. No. 803,214

Int. Cl. C21d *1/74*; C22C *39/20*, *4/102*

U.S. Cl. 148—12.1 17 Claims

A method for improving the properties of nitride-strengthened, stainless steel containing as a dispersoid therein particles of metal nitride which are present at an interparticle spacing of less than about 10 microns and which have a free energy of formation of greater than about −21,000 cal/mol. The method comprises the steps of heating the steel to a temperature which is generally in excess of 800° F. and subsequently compressing it. Pressure is conveniently applied by roll pressing and is generally sufficient to



compress the member by at least 5 percent.

A compressed nitride-strengthened, stainless steel article substantially free of pores and containing as a dispersoid therein particles of metal nitride which are present at an interparticle spacing of less than about 10 microns and which have a free energy of formation of greater than about −21,000 cal/mol.

3,615,905

METHOD OF TREATING STEEL

Arne Haraldsson Omsen, and Bertil Ring, both of Hagfors, Sweden, assignors to Uddeholms Aktiebolag, Hagfors, Sweden

Filed June 30, 1969, Ser. No. 837,766

Int. Cl. C21d *7/14*

U.S. Cl. 148—12.4 10 Claims

The toughness of a martensitic, air-hardening steel is increased by a novel combination of steps practiced in the course of hot working a billet of the steel. After a partial reduction of the billet the billet is reheated to a temperature at which carbides are dissolved, whereupon the reheated billet is worked to final dimension under conditions to bring about a complete recrystallization in the workpiece, after which the reduced workpiece is cooled so rapidly that precipitation of carbides in the austenite grain boundaries is substantially avoided.

3,615,906

PROCESS FOR FABRICATING THREADED ELEMENTS FROM THE AGE-HARDENABLE ALLOYS

Marvin C. Vanwanderham; John A. Harris, Jr., Palm Beach, Fla., and James J. Campbell, Cincinnati, Ohio, assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Mar. 27, 1969, Ser. No. 811,201

Int. Cl. C22f *1/00*, *1/10*; C21d *9/00*

U.S. Cl. 148—12.7 6 Claims

Threaded elements having improved mechanical properties for high-temperature service are fabricated from the age-hardenable superalloys in a process comprising: solution heat treating the alloy and establishing a grain size corresponding to ASTM 2–6, or more preferably ASTM 4–5; forming the threads; stabilization heat treating the threaded alloy; and aging.

3,615,907

METHOD OF ANNEALING AND CLEANING COILED METAL FOIL

Robert J. Perry, Sr., Havertown, Pa., and William L. Thome, Toledo, Ohio, assignors to Midland-Ross Corporation, Toledo, Ohio

Filed Oct. 25, 1968, Ser. No. 770,859

Int. Cl. C21d *1/26*; C22f *1/02*

U.S. Cl. 148—13.1 2 Claims

Placing a tightly wound coil of metal foil in a vacuum furnace as it is received from a rolling mill with a film of rolling oil on its surfaces, subjecting it to a partial vacuum so as to increase the rate of evaporation of the rolling oil, heating the coil to an annealing temperature in a protective atmosphere, and subsequently cooling the coil in a protective atmosphere under at least about atmospheric pressure.

3,615,908

HEATTREATMENT OF STEEL

Frederick David Waterfall, Birmingham, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Apr. 19, 1968, Ser. No. 722,573
Claims priority, application Great Britain, Apr. 28, 1967, 19,659/67
Int. Cl. C23c 9/16
U.S. Cl. 148—15.5 5 Claims

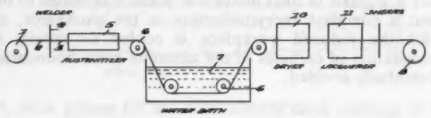
The present invention relates to the heattreatment of steel. More particularly it relates to the heattreatment of all types of iron and steel which are capable of hardening on heating to the austenitising range and then quenching, without the need to introduce additional carbon during the heating step. For the sake of simplicity these types of iron and steel will be referred to hereinafter as "steel of the class which can be hardened by heating and quenching." This class of materials comprises the plain carbon steels and cast steel of the medium- and high-carbon varieties and the alloy steels containing at least 0.25 percent by weight carbon. The present invention provides a method of heattreating steel of this class whereby the steel is provided with a surface layer that is resistant to scuffing and wear when subjected to friction under a heavy load and the underlying core is hardened so as to be resistant to indentation.

3,615,909

METHOD OF PRODUCING A STEEL PACKING STRIP

Hans-Wilhelm Grasshoff, Hagen, and Horst Turck, Hohenlimburg, both of Germany, assignors to Hoesch Aktiengesellschaft Hauptverwaltung, Dortmund, Germany

Filed Nov. 22, 1968, Ser. No. 778,074
Claims priority, application Germany, Nov. 23, 1967, P 16 08 164.4
Int. Cl. C21d 1/00, 9/46
U.S. Cl. 148—16.7 8 Claims



A steel packing strip with a tensile strength of around 95 to 125 kp./mm.², an elongation of δ5 of 10 to 17 percent and a yield point ratio of 0.7 to 0.9 is produced from rolled steel strip with a thickness of 0.30 to 1.3 mm. and a composition of about 0.10 to 0.20% C, at most 0.50% Si, possibly as much as 0.060% of P and S, 0.3% to 1% Mn, and the balance substantially all iron which is subjected to a continuous austenitizing annealing at a temperature of more than 820° C. and thereafter quenched in water to produce a structure with discrete particles of stress-laden ferrite.

3,615,910

MAGNETIC ALLOY AND CORE

Sadami Tomita, and Hiroyuki Oouchi, both of Hitachi-shi, Japan, assignors to Hitachi, Ltd., Tokyo-to, Japan

Filed Dec. 28, 1967, Ser. No. 694,217
Claims priority, application Japan, Dec. 28, 1966, 41/85381
Int. Cl. H01f 1/14, 3/02; C22c 19/00
U.S. Cl. 148—31.55 8 Claims

A magnetic alloy consisting essentially of less than 30 weight percent of cobalt, less than 30 weight percent of iron, less than 5 weight percent of a metal selected from the group consisting of copper and molybdenum, and the balance being essentially nickel and cores made therewith. The alloy has a Curie point greater than 620° C. and excellent rectangular hysteresis loop characteristics, such as, a Br/B_{10} value greater than about 90 percent.

3,615,911

SPUTTERED MAGNETIC FILMS

Ethan A. Nesbitt, Berkeley Heights; Jack H. Scaff, Bernards Township, Somerset County, N.J., and Henry C. Theuerer, New York, N.Y., assignors to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.

Filed May 16, 1969, Ser. No. 825,261
Int. Cl. ; C22c 19/00; H01f 1/04
U.S. Cl. 148—31.57 5 Claims

Sputtered films containing compositions exemplified by Co_5Sm sometimes with nonmagnetic diluents such as Cu manifest magnetic properties similar to the best reported for the corresponding bulk compositions. Coercivities for the best films are generally superior to the bulk coercivities and, in some instances, may be as high as tens of thousands of oersteds.

3,615,912

METAL-TREATING PROCESS

Friedrich Dittel, Mainz-Kostheim; Peter Jorns, Frankfurt am Main, and Walter Stenger, Frankfurt am Main, all of Germany, assignors to Hooker Chemical Corporation, Niagara Falls, N.Y.

Filed Feb. 16, 1970, Ser. No. 11,901
Claims priority, application Germany, Aug. 19, 1969, P 19 42 156.8
Int. Cl. C23f 7/08
U.S. Cl. 148- 6.15 R 7 Claims

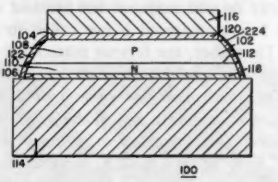
A process for forming a phosphate coating on metal surfaces wherein an alkali metal and/or ammonium orthophosphate solution, having a pH within the range of about 3.0 to 5.5 is sprayed on the metal surface at a pump pressure of from about 10 to 75 atmospheres. The process carried out in this manner is effective in both cleaning and coating the metal surfaces to which it is applied. In addition to the alkali metal and/or ammonium orthophosphate, the phosphating solution may also contain a benzoate, an hydroxyl amine, a molybdate, and a surface-active agent.

3,615,913

POLYIMIDE AND POLYAMIDE-POLYIMIDE AS A SEMICONDUCTOR SURFACE PASSIVATOR AND PROTECTANT COATING

Robert R. Shaw, Jeannette, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 8, 1968, Ser. No. 774,302
Int. Cl. H01l 7/00
U.S. Cl. 148—33.3 15 Claims



Exposed portions of PN junctions and exposed surfaces of bodies of semiconductor material are passivated and protected by a coating of a cured, material selected from the group consisting of aromatic polyimides and aromatic polyamide-polyimides.

3,615,914

METHOD OF STABILIZING PERMANENT MAGNETIC MATERIAL POWDERS

Joseph J. Becker, Schenectady, and Robert E. Cech, Scotia, both of N.Y., assignors to General Electric Company

Filed June 21, 1968, Ser. No. 738,809
Int. Cl. H01f 1/06
U.S. Cl. 148—101 10 Claims

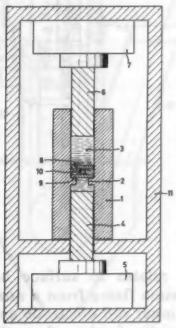
Method of stabilizing cobalt-rare earth material having a superior coercive force by contacting the particles with zinc or arsenic in an inert atmosphere at a temperature about the melting point of metal.

3,615,915

METHOD OF DENSIFYING MAGNETICALLY ANISOTROPIC POWDERS

Willem Luiten; Frans Frederik Westendorp, and Gijsbertus Maria Arnoldus Josephus de Kort, all of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 28, 1969, Ser. No. 871,893
Claims priority, application Netherlands, Oct. 31, 1968, 6815510
Int. Cl. H01f *1/11, 1/08*
U.S. Cl. 148—103 1 Claim



A method of densifying magnetically anisotropic powders under a magnetic field by the use of isostatic pressures of at least 10 kb.

3,615,916

MANUFACTURE OF PERMANENT MAGNETS

Stuart Walter Ker Shaw, Sutton Coldfield, and Derek Jim Palmer, Solihull, both of England, assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Jan. 27, 1969, Ser. No. 794,158
Claims priority, application Great Britain, Jan. 30, 1968, 4799/68
Int. Cl. H01f *1/04*
U.S. Cl. 148—103 29 Claims

An improved process of forming ingots of iron-aluminum-nickel-cobalt-titanium alloys, with or without copper and columbium, with a columnar crystal structure, useful for making magnets, comprising introducing sulfur, aluminum and titanium into a carbon-containing deoxidized melt of the other alloy constituents.

3,615,917

PROCESS FOR DIFFUSING SILICON INTO SHEET STEEL

Paik W. Shin, Coopersburg, and Richard M. Willison, Bethlehem, both of Pa., assignors to Bethlehem Steel Corporation

Filed July 11, 1969, Ser. No. 841,086
Int. Cl. H01f *1/16;* C21d *7/02;* C23c *9/00*
U.S. Cl. 148—111 10 Claims

A process for solid-state diffusion of silicon into sheet steel containing not more than 0.05 percent carbon, the process including preparing sheet steel by conventional methods of melting, pouring and rolling, coating the surfaces of the sheet steel with a layer of powder containing about 15 percent to about 95 percent silicon and the remainder substantially calcium, iron and incidental impurities, compacting the powder onto the sheet and heat treating the composite thus formed in a protective environment to cause a solid-state diffusion of the diffusible silicon into the sheet steel.

3,615,918

METHOD OF ANNEALING WITH A MAGNESIA SEPARATOR CONTAINING A DECOMPOSABLE PHOSPHATE

James D. Evans, and David W. Taylor, both of Middletown, Ohio, assignors to Armco Steel Corporation, Middletown, Ohio

Filed Mar. 28, 1969, Ser. No. 811,658
Int. Cl. H01f *1/18;* B22b *15/18*
U.S. Cl. 148—113 8 Claims

An annealing separator for magnetic materials, such as oriented silicon steel and the like, consisting essentially of magnesium oxide and/or hydroxide with an addition of a decomposable phosphate compound. The phosphate addition, which may be in the form of an inorganic phosphate, may be added to the magnesium oxide and/or hydroxide in such amounts as to produce a P_2O_5 content on the order of 1–25 percent by weight of the total coating. Preferably, the P_2O_5 will be present in an amount of at least 1 percent, and up to about 15 percent. A magnetic material processed according to standard procedures and coated with said composition prior to a final high temperature anneal, will yield a product having an improved glass film.

3,615,919

REACTIVE ALUMINUM NITRATE EDGE COATINGS FOR ELECTRICAL STEELS

Norman Pavlik, and George W. Weiner, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 30, 1969, Ser. No. 862,524
Int. Cl. H01f *1/18;* C23d *5/00*
U.S. Cl. 148—113 5 Claims

A process is described for preventing the adherence of the bottom edge of adjacent convolutions of a coil of silicon steel during final box annealing to produce a cube-on-face texture. The steps include the formulation of a reactive solution of aluminum nitrate, the application of said solution to a predetermined area and drying the same prior to the application of a nonreactive insulation coating thereto.

3,615,920

HIGH TEMPERATURE BRAZE HEAT TREATMENT FOR PRECIPITATION HARDENING MARTENSITIC STAINLESS STEELS

John A. Talento, Pittsburgh, Pa., assignor to The United States of America as represented by the United States Atomic Energy Commission

Filed Apr. 16, 1970, Ser. No. 29,261
Int. Cl. C21d *1/00;* C22c *39/20*
U.S. Cl. 148—125 7 Claims

A brazing and heat treating cycle is described as applied to semiaustenitic stainless steel sheet material. The steps include a brazing operation, solution annealing, trigger annealing, subzero cooling and tempering. The brazed assembly exhibits good mechanical properties and good corrosion resistance.

3,615,921

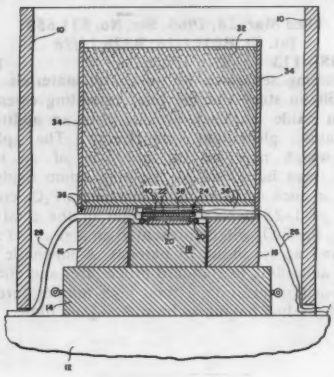
PROCESS FOR STRENGTHENING ALLOYS

Eugene J. Delgrosso, Wallingford, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Nov. 20, 1968, Ser. No. 777,381
Int. Cl. C22f *3/00, 1/18;* C21d *1/00*
U.S. Cl. 148—125 18 Claims

A process is provided for strengthening stainless steel and titanium alloys by explosive shocking of the alloys at

cryogenic temperatures while substantially prohibiting macroscopic deformation. The alloys are preferably



subjected to shock wave pressures of 225 to 275 kb. at temperatures of −100° to −200° F.

3,615,922

INHIBITING GRAIN GROWTH IN METAL COMPOSITES

Jerrold M. Alyea, Alton, Ill., assignor to Olin Mathieson Chemical Corporation

Filed Sept. 19, 1968, Ser. No. 760,992
Int. Cl. C21d *1/32;* **B32b** *15/00*
U.S. Cl. 148—127 **6 Claims**

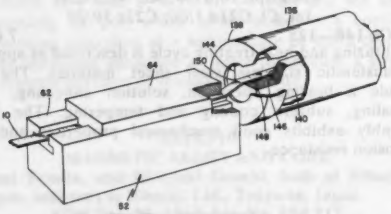
A process for producing composite metal articles whereby a suitable grain size is obtained in the metal member having the lowest temperature of recrystallization suitable for mechanical deformation, and the article produced thereby.

3,615,923

METHOD FOR PROCESSING OF STRIP METAL IN A CONTINUOUS MANNER TO REMOVE UNDESIRED CURVATURE

Thomas J. Rum, South Boston, Mass., assignor to The Gillette Company, Boston, Mass.

Division of Ser. No. 586,880, Oct. 14, 1966, Pat. No. 3,466,022.
Filed Jan. 31, 1969, Ser. No. 833,211
Int. Cl. C21d *1/18*
U.S. Cl. 148—131 **6 Claims**



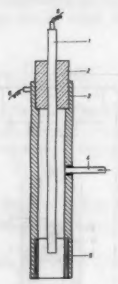
Razor blade strip steel 0.2 inch wide and 0.0015 inch thick is transferred at a 30 foot per minute rate sequentially through a hardening furnace, an air-cooled tubular transition zone, a quench unit, a freeze unit, a tempering furnace, and a continuous inspection station to a takeup reel. The vertical position of the quench unit relative to the transition zone is adjustable so that a differential stress may be applied to the steel strip to prevent or minimize a dish condition in the processed strip.

3,615,924

PROCESS AND APPARATUS FOR SURFACE HARDENING HARDENABLE STEELS

Karl Swoboda, Bechardgasse 17, Vienna III, and Maximilian Pater, Albert Bohlergasse 9, Kapfenberg, Styria, both of Austria

Continuation-in-part of application Ser. No. 486,053, Sept. 9, 1965, now abandoned. This application Jan. 26, 1968, Ser. No. 700,975
Int. Cl. C21d *1/06*
U.S. Cl. 148—143 **4 Claims**



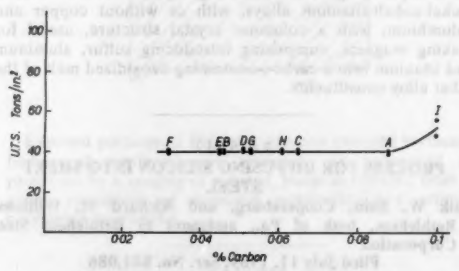
This invention relates to surface hardening hardenable steels with the plasma flame from a nozzleless plasma torch. The torch has an inner rod electrode and an outer electrode, which extends axially further than the rod electrode. A stream of ionizable gas passes through the torch and an electric arc discharge is sustained between the electrodes to create a plasma flame. The steel to be hardened is subjected to the flame to heat its surface at an extremely high rate to form metastable austenite. Then further energy is introduced, such as by mechanical shock, to transform the austenite into fine-grained martensite.

3,615,925

HEAT-TREATMENT OF STEELS

Sidney Garber, and Kenneth John Albutt, both of Birmingham, England, assignors to National Research Development Corporation, London, England

Filed Feb. 16, 1968, Ser. No. 705,996
Claims priority, application Great Britain, Feb. 21, 1967, 8088/67
Int. Cl. C21d *1/00*
U.S. Cl. 148—143 **5 Claims**



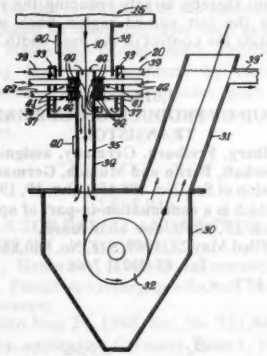
A process for treating wrought steel containing up to 0.10 percent carbon, 0.0–0.5 percent Mn, 0.0–0.05 percent P, 0.0–0.05 percent S, 0.0–0.005 percent N_2 and 0.0–0.1 percent Al, comprises heating said wrought steel to a temperature above the austenitization point but below the melting point of the steel and quenching said heated wrought steel at a selected cooling rate ranging from 100° C./sec. to 500° C./sec. to below transformation temperature range, said selected cooling rate providing in the treated wrought steel a tensile strength having an essentially consistent value for any

selected carbon content in said wrought steel up to about 0.10 percent carbon, and said essentially consistent tensile strength value being independent of the carbon content in said wrought steel up to about 0.10 percent carbon.

3,615,926
QUENCH SYSTEM

Harold L. Taylor, Hammond, Ind., assignor to Inland Steel Company, Chicago, Ill.

Filed Apr. 28, 1969, Ser. No. 819,756
Int. Cl. C21d *1/18*
U.S. Cl. 148—143 **19 Claims**

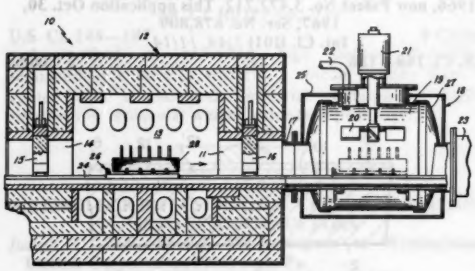


Low-carbon unalloyed steel strip is heated to a temperature at least above the A_1 point, preferably above the A_3 point, and is quenched to transform substantially all the austenite to martensite. Quenching is accomplished by passing the heated strip through an elongated restricted quench channel having high-velocity quench liquid flowing through the channel, either concurrently or countercurrently. The temperature and flow velocity of the quench liquid are regulated in the channel so as to provide an initial high rate of heat withdrawal from the strip and a subsequent lower rate of heat withdrawal during the time the strip is quenched through the temperature range of martensite formation, thereby effecting tempering of the martensite.

3,615,927
METHOD FOR HEAT TREATING METALLIC ARTICLES

Carl G. Paulson, West Kingston, R.I., assignor to C. I. Hayes Inc., Cranston, R.I.

Filed Oct. 16, 1967, Ser. No. 675,437
Int. Cl. C21d *1/70*
U.S. Cl. 148—149 **4 Claims**

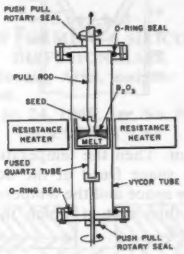


The method and apparatus for heat-treating metallic articles, wherein the articles are embedded in a ceramic fiber work holder such that the embedded portion is prevented from reaching a temperature during the heat-treating operation that produces a hardening action thereon, the nonhardened portion of the articles being easily stamped or marked with identifying indicia thereon after the heat-treating operation.

3,615,928
GROWTH OF $PB_{1-x}SN_xTe$ FROM NONSTOICHIOMETRIC MELTS

John W. Wagner, Diamond Bar, and Robert K. Willardson, Arcadia, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy

Filed Oct. 8, 1969, Ser. No. 864,721
Int. Cl. H01l *7/40*; B01j *17/00*
U.S. Cl. 148—172 **5 Claims**

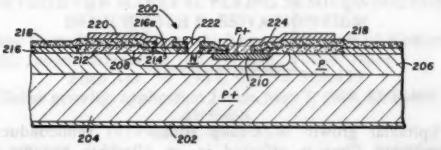


Single crystals of $Pb_{1-x}SN_xTe$ grown from nonstoichiometric, cation-rich melts; the as-grown, bulk material containing carrier concentrations ranging from $10^{16}/cm.^3$ to $10^{20}/cm^3$.

3,615,929
METHOD OF FORMING EPITAXIAL REGION OF PREDETERMINED THICKNESS AND ARTICLE OF MANUFACTURE

William M. Portnoy, Richardson; Warren P. Waters, Dallas, and Emery C. Wisman, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed July 8, 1965, Ser. No. 470,456
Int. Cl. H01l *7/36*; C23c *13/00*; B02j *17/00*
U.S. Cl. 148—175 **10 Claims**



A process is disclosed for fabricating semiconductor devices in which a patterned oxide film of a predetermined thickness is formed on a semiconductor substrate followed by epitaxially forming on exposed areas of the substrate a layer of semiconductor material having a preselected thickness relative to the thickness of the oxide layer.

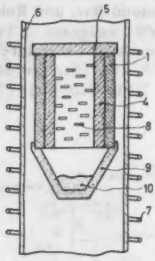
3,615,930
METHOD OF MANUFACTURING SILICON CARBIDE CRYSTALS

Wilhelmus Franciscus Knippenber, Emmasingel, Eindhoven, Netherlands, and Arthur William Moore, Parma, Ohio, assignors to U. S. Philips Corporation, New York, N.Y.

Filed Oct. 25, 1967, Ser. No. 677,897
Claims priority, application Netherlands, Oct. 25, 1966, 6,615,060
Int. Cl. H01l *7/00*; C01b *31/36*; R01j *17/28*
U.S. Cl. 148—175 **2 Claims**

A method of manufacturing silicon carbide crystals with a narrow PN junction in which during growth of such crystals

by recrystallization and/or condensation in an inert gas atmosphere in a space bounded by silicon carbide, dopants which can result in different conductivities are successively supplied to the crystallization space. N-type crystals are formed at temperatures between 2,300° and 2,600° C. in



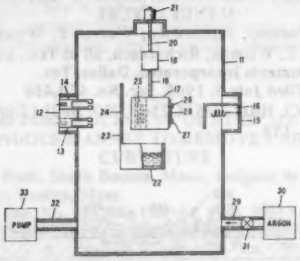
presence of a donor. Then the temperature is decreased to 2,000° C. and the space freed of the donor. Aluminum is then supplied to the space and the temperature raised to 200° to 300° C. lower than that at which the first part of the crystals were formed.

3,615,931

TECHNIQUE FOR GROWTH OF EPITAXIAL COMPOUND SEMICONDUCTOR FILMS

John R. Arthur, Jr., Murray Hill, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 27, 1968, Ser. No. 787,470
Int. Cl. H01l *7/36;* **C01b** *31/36;* **C23c** *11/00*
U.S. Cl. 148—175 **12 Claims**



Epitaxial growth of Group III(a)–V(a) semiconductor compound films is effected in an ultrahigh vacuum by directing collimated molecular beams at the surface of a suitable substrate member preheated to a temperature ranging from 450°–650° C. The described process is a nonequilibrium growth technique which permits the growth of epitaxial films less than 1 micron in thickness at temperatures appreciably below those commonly employed in epitaxy.

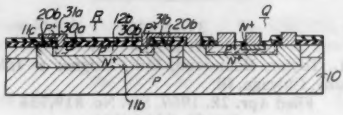
3,615,932

METHOD OF FABRICATING A SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Tsugio Makimoto, and Michiyoshi Maki, both of Kodaira-shi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed July 16, 1969, Ser. No. 842,304
Claims priority, application Japan, July 17, 1968, 43/50298
Int. Cl. H01l *7/36, 3/00;* **C23c** *13/00*
U.S. Cl. 148—175 **6 Claims**

A method of fabricating a semiconductor integrated circuit device in which a plurality of kinds of impurities for defining a collector wall region, a base region and an emitter region are simultaneously diffused by one heat treatment into an epitaxial layer formed on one surface of a semiconductor body with at least one region having a conductivity type opposite to that of the semiconductor body formed in the



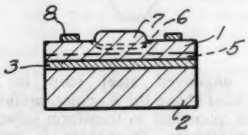
said one surface, the last named region becoming a part of a collector region, thereby largely reducing the rediffusion of an impurity in the last named region back into the base region to facilitate the control of the base width.

3,615,933

METHOD OF PRODUCING A GERMANIUM TRANSISTOR

Reinhard Dahlberg, Freiburg, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Division of Ser. No. 498,158, Oct. 19, 1965 abandoned , which is a continuation-in-part of application Ser. No. 4,541, Jan. 25, 1960, now abandoned.
Filed May 22, 1969, Ser. No. 840,888
Int. Cl. H01l *7/46*
U.S. Cl. 148—177 **5 Claims**



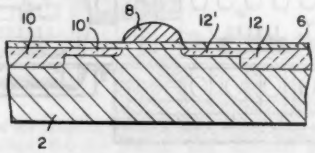
The method of making transistors in which germanium and tantalum discs are joined by an adhesion metal such as aluminum such that the joined surfaces form an electrical contact and forms the collector. The emitter is formed on the second side of the germanium disc by alloying a pill of metal into the disc and the base is formed on the remaining portion of the second side. The adhesion metal dopes the germanium during the joining process.

3,615,934

INSULATED-GATE FIELD-EFFECT DEVICE HAVING SOURCE AND DRAIN REGIONS FORMED IN PART BY ION IMPLANTATION AND METHOD OF MAKING SAME

Robert W. Bower, Palos Verdes, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of application Ser. No. 590,033, Oct. 27, 1966, now Patent No. 3,472,712. This application Oct. 30, 1967, Ser. No. 678,809
Int. Cl. H01l *7/44, 11/14*
U.S. Cl. 148—186 **3 Claims**



Field effect device having diffused major source and drain regions spaced from each other on a common surface of a semiconductor body with insulated gate member disposed on same surface and spaced from and between the source and drain regions, and shallow regions formed by ion implantation using the gate member as a mask extending

from the periphery of the gate member to the source and drain regions.

3,615,935

FABRICATION OF SEMICONDUCTOR DEVICES UTILIZING BOMBARDMENT-ENHANCED ETCHING OF INSULATING LAYERS

Terence W. O'Keeffe, Pittsburgh, and Melvyn W. Larkin, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 22, 1967, Ser. No. 640,164
Int. Cl. H01l 7/54
U.S. Cl. 148—187 6 Claims

A process for the fabrication of semiconductor devices is described utilizing an insulating layer such as silicon dioxide for diffusion masks and contact mask wherein openings in the insulating layer are produced by etching following selective bombardment with particles such as electrons without the use of conventional etch-resistant materials such as photoresists.

3,615,936

SEMICONDUCTOR DEVICE AND METHOD OF MAKING THE SAME

Monika Batz, Heilbronn, (Neckar), Germany, assignor to Telefunken Patentverwertungsgesellschaft mbH, Ulm am Danube, Germany

Filed May 24, 1968, Ser. No. 731,945
Claims priority, application Germany, June 1, 1967, T 34003
Int. Cl. H01l 7/44
U.S. Cl. 148—187 6 Claims

A semiconductor device and a method for making the same. The device includes a semiconductor body having at least one PN junction created by the diffusion of impurities into the body. The device further includes an intermediate layer arranged on the surface of the semiconductor body and made of a material having a higher diffusion constant for the diffused impurities than the semiconductor body. The method includes the steps of applying the intermediate layer to the semiconductor body, applying a masking layer, having a diffusion window opening, to the intermediate layer and diffusing the impurities into the semiconductor body, through the diffusion window and the intermediate layer.

3,615,937

PLASTICIZER ADDITIVE TO PHOTORESIST FOR THE REDUCTION OF PIN HOLES

Robert H. Collins, Poughkeepsie, and Frank T. Deverse, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 17, 1968, Ser. No. 737,355
Int. Cl. H01l 7/00, 7/34
U.S. Cl. 148—187 9 Claims

A method of providing high output monolithic semiconductor devices wherein a silicon dioxide layer is coated with a photoresist material containing a highly volatile, low molecular weight, ester-type plasticizer.

3,615,938

METHOD FOR DIFFUSION OF ACCEPTOR IMPURITIES INTO SEMICONDUCTORS

Joseph C. Tsai, Laurel, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 553,222, May 26,1966.
Filed Jan. 28, 1969, Ser. No. 794,550
Int. Cl. H01l 7/44
U.S. Cl. 148—187 1 Claim

A diffusion process for acceptor impurities is provided wherein, after deposition of the impurity on the semiconductor surface, the surface is covered by a deposited insulating layer to avoid out diffusion during the heating to drive in the deposited impurity.

3,615,939

METHOD OF MAKING A LATERAL TRANSISTOR

William C. Schneider, Williamstown, Mass., assignor to Sprague Electric Company, North Adams, Mass. Continuation of Ser. No. 550 698, May 17, 1966, abandoned.

Filed Jan. 15, 1969, Ser. No. 799,541
Int. Cl. H01l 7/00
U.S. Cl. 148—187 3 Claims

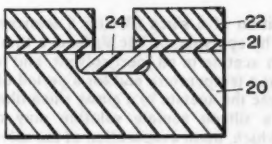
The emitter is restricted to the lateral wall of a recess adjacent the collector. Undesirable flow of emitter current into the bulk of the base region is prevented by providing a nonconducting plug in the bottom of the recess. A common emitter DC current gain which is substantially larger than one is obtained by this construction.

3,615,940

METHOD OF FORMING A SILICON NITRIDE DIFFUSION MASK

Ki Dong Kang, Phoenix, Ariz., assignor to Motorola, Inc., Franklin Park, Del.

Filed Mar. 24, 1969, Ser. No. 809,555
Int. Cl. H01l 7/44
U.S. Cl. 148—187 2 Claims



A method of forming a silicon nitride diffusion mask on the surface of a semiconductor wafer is described. The method utilizes the steps of depositing a relatively low-density silicon nitride film at temperatures in the range of 450° to 750° C. and etching the low-density film with a low-temperature hydrogen fluoride etch. The density of the silicon nitride mask is increased by heating it to a temperature of about 900° to 1,000° C. The densification takes place during the diffusion of impurities into the wafer since a diffusion step normally utilizes temperatures in the range of 800° to 1,300° C.

3,615,941

METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICE WITH PASSIVATION FILM

Eiichi Yamada, and Masayuki Yamamoto, both of Kodaira-shi, Japan, assignors to Hatachi, Ltd., Tokyo, Japan

Filed Apr. 30, 1969, Ser. No. 820,433
Claims priority, application Japan, May 7, 1968, 43/30465; 43/30466
Int. Cl. H01l 7/34
U.S. Cl. 148—187 12 Claims

A method for manufacturing a semiconductor device whose surface is passivated by a silicon oxide film, forming a pyrolytic silicon oxide film on the surface of a semiconductor substrate at a temperature no higher than 900° C., depositing phosphorus oxide from a vapor phase containing phosphorus at a temperature no higher than 900° C. on the surface of said silicon oxide film, and causing a reaction between the surface layer of silicon oxide and phosphorus oxide at a temperature no higher than 900° c., thereby forming in the surface of said deposited film a glass layer mixed with phosphorus oxide and silicon oxide.

3,615,942

METHOD OF MAKING A PHOSPHORUS GLASS PASSIVATED TRANSISTOR

Martin Albert Blumenfeld, Somerville, and Kurt Jaques Sonneborn, Bound Brook, both of N.J., assignors to RCA Corporation

Filed June 5, 1969, Ser. No. 830,822
Int. Cl. H01l 7/44
U.S. Cl. 148—187 6 Claims

Phosphosilicate glass is incorporated in the passivating oxide on the surface of a diffused planar bipolar transistor by

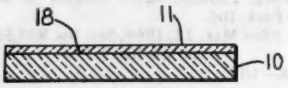
the steps of (1) forming a masking coating over a diffused base region in a body of semiconductive material; (2) depositing phosphosilicate glass on the surface of the device to form a shallow, highly doped emitter region in said base region; (3) depositing a protective silicon dioxide coating by the pyrolysis of silane (SiH_4) on the phosphosilicate glass, and (4) coating the silicon dioxide coating with photoresist and photolithographically removing a portion of all of the coatings down to the silicon surface adjacent to the emitter.

3,615,943

DEPOSITION OF DOPED AND UNDOPED SILICA FILMS ON SEMICONDUCTOR SURFACES

Milton Genser, 10 Lancer Drive, Short Hills, N.J.

Filed Nov. 25, 1969, Ser. No. 879,691
Int. Cl. H01l *7/34;* **C03c** *17/30*
U.S. Cl. 148—188 **9 Claims**



Deposition of a silica film on a semiconductor surface is effected by applying, on the surface, a thin film of a solution of silicon acetate in an inert solvent, and heating the coated surface at a temperature and for a period of time adequate to decompose the acetate to a glassy silica film.

Such a silicon acetate solution may contain a soluble dopant which, upon evaporation of the solvent and heating to diffusion temperature, will enable the dopant to diffuse into any exposed semiconductor surfaces.

The silicon acetate used in this invention may be one of the compounds having the following general formula:

in which R is a substituent of the class consisting of an acetate or a vinyl group.

3,615,944

METHOD FOR THE CONTINUOUS DOPING OF SEMICONDUCTOR MATERIALS

Henry P. Sheng, Narman, Okla., and F. Thomas Wooten, Raleigh, N.C., assignors to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 529,288, Feb. 23, 1966, Pat. No. 3,473,510. Filed Dec. 13, 1968, Ser. No. 798,240
Int. Cl. H01l *7/44*
U.S. Cl. 148—189 **13 Claims**

A method for continuously doping semicondcutor materials whereby the materials are placed in separate chambers which are sequentially exposed to preheating, doping and cooling.

3,615,945

METHOD OF MAKING SEMICONDUCTOR DEVICES

Masami Yokozawa, Osaka, Japan, assignor to Matsushita Electronics Corporation, Osaka, Japan

Filed June 11, 1969, Ser. No. 832,281
Claims priority, application Japan, June 21, 1968, 43/53043
Int. Cl. H01l *7/44*
U.S. Cl. 148—190 **12 Claims**

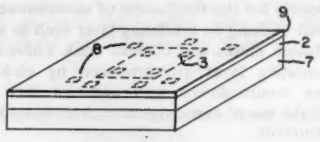
A deep aluminum-diffused P-type layer and a shallow-diffused layer of a preselected conductivity type are simultaneously diffused into a semiconductor substrate by a double diffusion process which employs a composite impurity source. The composite impurity source consists of an aluminum receptacle having a predetermined amount of at least one shallow diffusing, conductivity type determining impurity enclosed therein. The receptacle may be fabricated from a uniformly thick aluminum foil and the shallow diffusing impurity may consist of, for example, boron, phosphorus, indium and/or antimony.

3,615,946

METHOD OF EMBEDDING SEMICONDUCTOR CHIP WITHIN A DIELECTRIC LAYER FLUSH WITH SURFACE

Gerald G. Palmer, Liverpool, N.Y., assignor to General Electric Company

Filed Dec. 1, 1967, Ser. No. 687,195
Int. Cl. B32b *31/14;* **C23f** *1/00*
U.S. Cl. 156—3 **3 Claims**



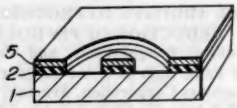
A method of embedding a semiconductor chip within a dielectric bonding layer, normally employed to bond said chip to a dielectric supporting substrate, so that the metallized face of said chip is flush with an extremely smooth surface of the dielectric layer. The present method permits readily made coplanar connections between the chip's contact electrodes and conductive patterns that may be formed contiguous with the dielectric layer surface. In performing the process, a chip is set upon the layer of dielectric material. A thin sheet of metal is placed over the chip and the surface of the dielectric layer. A platen, the face of which is ground flat to a high degree of smoothness, is pressed down upon the metal sheet in the presence of heat applied to said dielectric layer until the face of the chip becomes flush with the surface of said layer. The platen is removed and the metal sheet etched away.

3,615,947

METHOD OF SELECTIVE ETCHING

Eiichi Yamada, Kodaira-shi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 12, 1967, Ser. No. 689,941
Claims priority, application Japan, Dec. 16, 1966, 41/82092
Int. Cl. B32b *31/26;* **C23f** *1/02*
U.S. Cl. 156—3 **6 Claims**



A method of selective removal of a silicon nitride film covering the surface of a semiconductor substrate. A thin layer of aluminum, titanium or chromium is partially formed on the silicon nitride film in accordance with a geometrical pattern. The thin layer is oxidized to become etching-proof. Thereafter the film is dipped in a hydrofluoric acid solution, whereby the exposed portion of the nitride film is selectively removed using the oxidized thin layer as a mask.

3,615,948

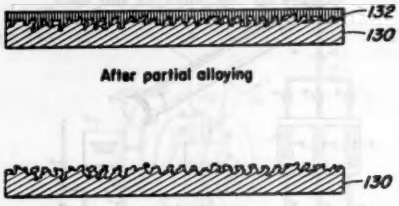
CONCENTRATION FUEL CELL

Wolfgang P. Krostewitz, Rock Road West, Green Brook, N.J.

Filed Dec. 27, 1967, Ser. No. 693,959
Int. Cl. B44c *1/22;* **B32b** *33/00;* **H01m** *27/04*
U.S. Cl. 156—3 **1 Claim**

The present invention provides a fuel cell comprising a fuel chamber and oxidizer chamber, an electrolyte chamber having electrolyte therein, the electrolyte chamber being hermetically sealed from the first two chambers by a first

closed electrode separating the electrolyte chamber from the oxidizer chamber, and by a second closed electrode separating the fuel chamber from the electrolyte chamber. Each of the electrodes are composed of a material selectively



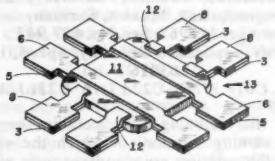
permeable to only one of the cell reactants and substantially impermeable to the others, their impurities, and reaction products. Said electrodes are formed by vapor deposition on a porous metal base of an easily removable metal coating which is selectively etched away.

3,615,949

CROSSOVER FOR LARGE SCALE ARRAYS

Robert E. Hicks, Baltimore, Md.

Filed Nov. 5, 1968, Ser. No. 773,452
Int. Cl. H05k *1/00, 3/06*
U.S. Cl. 156—3 **6 Claims**



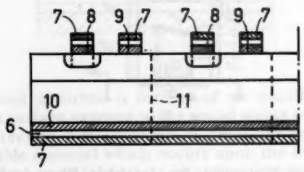
The subject invention relates to a method for providing crossovers in microelectronic circuitry. More particularly, the subject invention contemplates the fabrication of crossovers by deposition of insulative material on a conductor at the point of crossover and subsequent deposition of a crossing conductor over the insulative "bridge." Additional advantages other than the elimination of point-to-point wiring methods include improved circuit reliability; room temperature circuit assembly; decreased manufacturing time; increased unit density; "flip-chip" utilization; and reduction of stray capacitance.

3,615,950

METHOD OF ETCHING SILVER-TIN-LEAD CONTACTS ON A NICKEL COATED BASE

Rodolphe Lacal, Monza, Italy, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 15, 1969, Ser. No. 816,301
Claims priority, application France, Apr. 19, 1968, 148719
Int. Cl. H01l *7/00, 7/50;* **C23f** *1/00*
U.S. Cl. 156—3 **4 Claims**



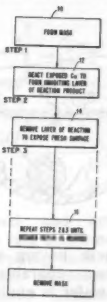
A method of chemically etching away lead-tin-silver alloy layers from a base in which the body is dipped in a solution of ammonia and an ammonium salt and then etched in a solution of hydrogen peroxide and an acid.

3,615,951

METHOD FOR ETCHING COPPER

Jack R. Franco, Poughkeepsie; Paul A. Totta, Poughkeepsie, and James F. White, Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 20, 1969, Ser. No. 835,009
Int. Cl. H05k *3/06;* **C23f** *1/02*
U.S. Cl. 156—3 **13 Claims**



A method for subtractive etching copper adapted to form very fine line patterns. In the method a mask is deposited on the copper surface, the copper surface exposed to an environment containing an oxidizing agent which causes the formation of an adherent self thickness limiting coating of a copper compound on the exposed surface, the resultant adherent coating removed in a second environment, and the steps of forming the coating and removing repeated until the desired amount of copper has been removed.

3,615,952

PHOTORESIST COMPOSITION AND METHOD OF FORMING AND USING THE SAME

Edmund Benjamin Davidson, Yardley, Pa., assignor to RCA Corporation

Filed Oct. 20, 1969, Ser. No. 867,907
Int. Cl. C23f *1/02;* **G03c** *1/00*
U.S. Cl. 156—13 **12 Claims**

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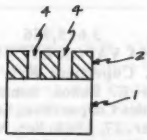
A resist composition comprising an alkyd resin made by reacting together phthalic anhydride, pentaerythritol, trimethyl propane, tall oil fatty acid, and benzoic acid and then removing about 15–40 percent of the low molecular weight ends. The resist may be made photosensitive by adding a sensitizer.

3,615,953

ETCH-RETARDING OXIDE FILMS AS A MASK FOR ETCHING

Bryan H. Hill, Dayton, Ohio

Filed Dec. 17, 1968, Ser. No. 784,344
Int. Cl. H01l *7/50;* **H05k** *3/06*
U.S. Cl. 156—17 **3 Claims**



A technique for making certain oxides resistant to etching compositions. Anodized and evaporated films of Al_2O_3 and

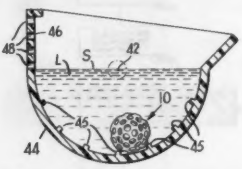
anodized films of Ta_2O_5 have been found to become etch-retarding when subjected to an electron beam supplied, for example, by an electron microscope. Scanning of selected areas enables one to carry out etching processes used in the preparation of integrated circuits without resorting to lengthy conventional masking techniques.

3,615,954

TREATMENT OF SMALL SEMICONDUCT OR WAFERS WITH ETCHANT

Max C. Kennison, Cleveland, Ohio, assignor to Ortec, Incorporated, Oak Ridge, Tenn.

Filed Oct. 5, 1967, Ser. No. 673,070
Int. Cl. H01l 7/50; C23g 1/02
U.S. Cl. 156—17 **2 Claims**



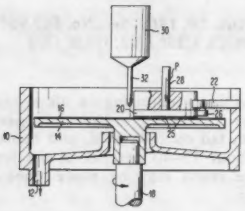
A hollow, rigid sphere having a multiplicity of holes therein is formed in two separable hemispheres. A disk-shaped semiconductor wafer is enclosed within the sphere, and the sphere is inserted in a vessel containing an etching liquid. The sphere prevents the wafer from floating on the surface of the liquid or adhering to the walls or bottom of the vessel. The flat faces of the wafer are maintained out of contact with the sphere and are subjected to uniform treatment by the liquid.

3,615,955

METHOD FOR POLISHING A SILICON SURFACE

Joseph Regh, Wappingers Falls, N.Y., and Gene A. Silvey, deceased, late of Poughkeepsie, N.Y. (by Harriett E. Silvey, executrix), assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 28, 1969, Ser. No. 804,739
Int. Cl. H01l 7/50
U.S. Cl. 156—17 **10 Claims**



A silicon surface is polished by a simultaneous application of mechanical and chemical polishing procedures. The silicon surface to be polished is maintained continuously wetted with an excess quantity of a displacement plating solution containing a mercury cation and a fluoride anion. Mercury is deposited on the surface by the displacement of silicon and a simultaneous and continuous wiping of the surface removes the mercury from the high areas on the silicon surface.

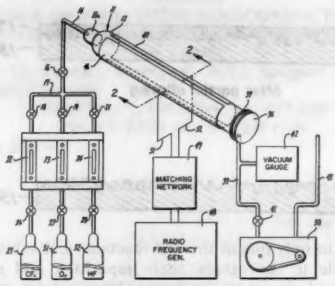
3,615,956

GAS PLASMA VAPOR ETCHING PROCESS

Stephen M. Irving, Cupertino; Kyle Eugene Lemons, San Jose, and George E. Bobos, Santa Clara, all of Calif., assignors to Signetics Corporation, Sunnyvale, Calif.

Filed Mar. 27, 1969, Ser. No. 810,997
Int. Cl. H01l 7/44, 7/50; H05k 3/06
U.S. Cl. 156—17 **19 Claims**

Gas plasma vapor etching process utilized for removing portions of material from a semiconductor structure for a number of purposes including polishing and cleaning of the silicon wafers, finding pin holes in an insulating layer



covering the semiconductor wafer and forming scribe lines in the wafer to thereafter permit the wafer to be mechanically broken into dice without any substantial damage to the dice.

3,615,957

METHOD FOR ETCHING METALLIC COPPER WITH CHROMOSULFURIC ACID AND REGENERATING THE ETCHING SOLUTIONS AS WELL AS RECOVERING THE CORRODED COPPER

Eftimios Konstantouros, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 3, 1967, Ser. No. 627,942
Claims priority, application Germany, Apr. 4, 1966, S 103016
Int. Cl. C01g 37/02; C22d 1/16; C23f 1/00
U.S. Cl. 156—19 **9 Claims**

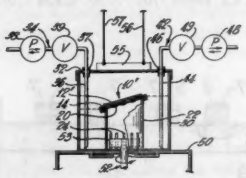
Process for the etching of metallic copper with chromosulfuric etching solution, in which the etching and regenerating of the solution are simultaneously effected but spatially separated from each other, the etching solution being circulated between the etching vessel and the anode space of an electrolytic cell provided with a diaphragm, in the anode space of which chromium-III-ions produced in the etching operation are oxidized anodically and half of the sulfuric acid consumed in the etching is reformed, and when copper-II-ions in the circulated etching solution reaches a specified concentration, crystallizing out the copper sulfate and utilizing a solution thereof in the cathode space of the electroyltic cell to separate out metallic copper at the cathode and reproduce the second half of the sulfuric acid consumed in the etching process.

3,615,958

LEACHING GLASS FILMS FOR FILTER MAKING

Charles I. Cohen, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation

Filed May 3, 1968, Ser. No. 726,305
Int. Cl. C03c 15/00, 25/06
U.S. Cl. 156—24 **12 Claims**



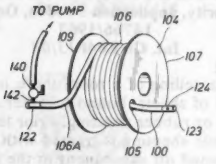
Apparatus and method for leaching films including a container having within it means for supporting the film in inclined disposition during introduction and removal of heated fluids.

3,615,959

VACUUM FILLING PROCESS FOR LIQUID FILLED MARINE SEISMIC CABLES

Larry J. Nance, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed July 22, 1969, Ser. No. 843,451
Int. Cl. H01b 13/00, 17/34
U.S. Cl. 156—48 3 Claims



A technique for completely filling a stoppered hollow marine seismic cable with a compatible filling liquid such as kerosene, wherein the air in a hollow cable on a spool is first evacuated with a vacuum pump, and wherein the liquid is thereafter pumped into the cable until it is full. Improved evacuation and filling means are also provided which prevent loss of vacuum during the filling process.

3,615,960

BONDING USING EPOXY RESIN COMPOSITION AND NONACTIVATED BLOWING AGENT

Kiyoshi Hoshii, Ichikawa-shi; Hisao Ishikawa, Tokyo, and Keishi Tado, Ichikawa-shi, all of Japan, assignors to The Fujikura Cable Works Limited, Tokyo, Japan

Filed Feb. 26, 1968, Ser. No. 708,317
Int. Cl. H02g 1/14
U.S. Cl. 156—49 15 Claims

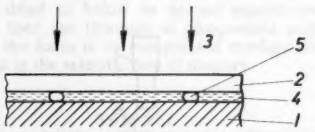
Epoxy resin composition consisting essentially of an epoxy resin component, curing agent, thermally decomposable blowing agent and optionally thermoplastic polymer, said composition, after curing, being capable of being broken up by expanding with the application of heat. It is used, for example, in joining cables by connecting core wires, slipping sleeve over portion where core wires have been connected, sealing said sleeve and sheath by said epoxy composition and thereafter curing said epoxy composition to form sealed portion, said sealed portion being capable of subsequent dismantlement.

3,615,961

SOUND ABSORBER AND METHOD OF MAKING THE SAME

Erwin Meyer, and Klaus Diether Brendel, both of Goettingen, Germany, assignors to Gruenzweig & Hartmann AG, Ludwigshafen, Germany

Filed Feb. 8, 1965, Ser. No. 430,850
Claims priority, application Germany, Feb. 7, 1964, Sept. 10, 1964, M 59837 and M 59837
Int. Cl. B32b 27/04, 27/14, 27/40
U.S. Cl. 156—62.2 3 Claims



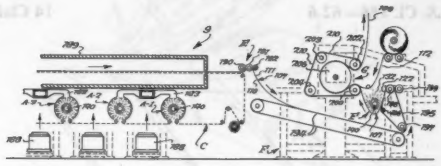
A sound absorber is formed of an oscillatable material having a surface exposed to the sound waves which move in a given direction, a material which will cause oscillation of the oscillatable material which occurs upon the impact of sound waves thereon to take place in a direction transverse to the given direction, and a material causing dampening of oscillations which is in engagement with the oscillatable material or the material causing change in the direction of the oscillations and capable of dampening the transverse oscillations.

3,615,962

METHOD OF AND APPARATUS FOR FORMING FORMATIONS MATERIAL AND COMPOSITE MATERIAL

Peter D. Kaspar, Dover, Del., assignor to International Playtex Corporation, Dover, Del.

Filed Feb. 13, 1968, Ser. No. 705,210
Int. Cl. B29d 27/02; B32b 31/22
U.S. Cl. 156—62.2 20 Claims



A continuous method and apparatus for forming foraminous sheet film having elastomeric properties and for composite materials including such film is disclosed. The method generally includes the steps of driving successive portions of a continuous foraminous conveyor in a substantially cylindrical path depositing a material in particularized form which material in dry form possesses elastomeric properties onto and about the inner surface of such cylindrical path; drying such material into a foraminous sheet film and removing said film from said conveyor. The process also may include the adherence of either one or two plies of material to the film.

The apparatus includes a deposition arrangement including means to deliver a flowable material which in dry form possesses elastomeric properties to a foraminous conveyor to provide a continuous foraminous film having elastomeric properties.

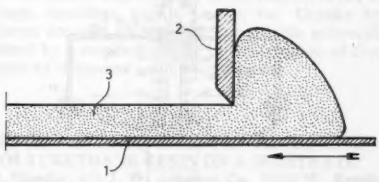
The preferable deposition apparatus includes a centrifugal dish-like member adapted to deliver the flowable material in particularized form onto the foraminous forming surface.

3,615,963

PANELS FROM SETTLED PARTICLES LIQUID BINDER AND ABSORBENT LAYER

Karl L. B. Johansson, and Karl Oskar Wikholm, both of Huskvarna, Sweden, assignors to Cebem Aktiebolag, Jonkoping, Sweden

Filed Jan. 3, 1969, Ser. No. 788,804
Claims priority, application Sweden, Jan. 19, 1968, 765/68
Int. Cl. B29j 5/04
U.S. Cl. 156—62.2 2 Claims



The invention is concerned with wall panels and other construction units comprising a mixture of solid particles and liquid resinous bonding agent, said mixture being distributed on a base in such a manner that the volume of bonding agent exceeds the volume of the spaces between said solid particles. The solid particles are now allowed to settle and the excess bonding agent is allowed to rise to the top of said

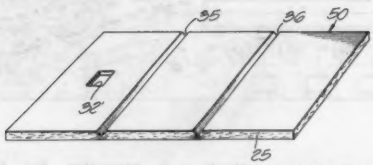
solid particles so as to form an outer layer, into which one side of an absorbent layer is applied to absorb the bonding agent, which finally is cured. In this manner there will be obtained a strong composite construction unit having a smooth surface.

3,615,964

METHOD OF FORMING CREASED FIBER GLASS BLANKET

Joseph G. Malone, San Marino, Calif., assignor to Industrial Insulations, Inc., San Gabriel, Calif.

Filed Sept. 20, 1968, Ser. No. 761,090
Int. Cl. B32b *17/04*
U.S. Cl. 156—62.6 **14 Claims**



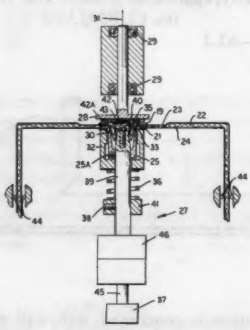
An apparatus and method of processing fiber glass to form a blanket of desired density and featuring areas of greater density to provide pockets and/or hinged sections of a desired size and shape. The fibers carry a sparse film of heat-cured binder material holding the fibers in desired relative positions at their points of crossover. The blanket is preferably prepared in a continuous process and, if desired, is laminated to flexible sheet material as, for example, heat-reflecting foil. The hinges formed by the invention technique are resilient and possess a pronounced memory for return to the position in which held while the binder takes a set. The resulting product has many uses including one-piece ducts and liners for a wide variety of chambers, refrigerators, furnaces, and many others.

3,615,965

METHOD OF MAKING A CONTAINER CLOSURE

Rulo Wayne Smith, Auburn, and Kenneth Lyle Summers, Hudson, both of Ind., assignors to Rieke Corporation, Auburn, Ind.

Filed Jan. 23, 1969, Ser. No. 793,260
Int. Cl. B29c *27/02*; B65b *7/18*; F16l *37/08*
U.S. Cl. 156—69 **5 Claims**



A flexible retractable and extensible closure of plastic is secured to a corrugated fiberboard container coated with plastic or a material fusible to the closure, by providing upper, lower, or both upper and lower flanges on a portion of the spout member, the flanges being fused to facing surfaces of the container top around an opening in the top, by spin welding, or other heating means to provide single or double liquid and vaportight seals around the opening.

3,615,966

METHOD OF FORMING A CEILING COVER STRUCTURE OF SWELLABLE PLASTIC SHEETING

Sven Olof Birger Ljungbo, Eneby, Balsta, Sweden

Filed Oct. 24, 1968, Ser. No. 770,404
Claims priority, application Sweden, Oct. 27, 1967, 14766/1967
Int. Cl. E04f *13/08*
U.S. Cl. 156—71 **5 Claims**

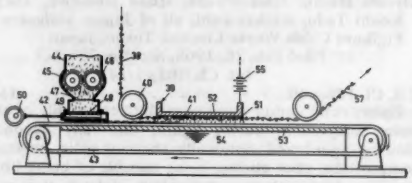
For covering a ceiling of a room there is used an integral cover composed of sheets, bound together at their edges, of swellable plastic or rubber sheeting. Prior to being erected in position the plastic sheeting is treated with a swelling agent; the excess is drained off subsequent to the material swelling, whereafter the sheeting after being swollen to an increase in size of at least 2 percent, is erected by means of conventional mechanical attachment means as a ceiling cover structure and the swelling agent caused to evaporate totally, whereupon the sheeting contracts and obtains a flat, stretched surface.

3,615,967

METHOD OF MANUFACTURING A FIBROUS FABRIC

Pius Stebler, Grillingerstr, Nunninger, Switzerland

Filed Aug. 2, 1968, Ser. No. 749,782
Int. Cl. B31c *13/00*; B65h *81/00*; D05c *15/00*
U.S. Cl. 156—72 **9 Claims**



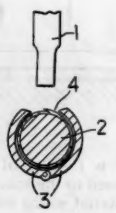
A method of manufacturing a fibrous fabric in which fibers are injected into a web of fibrous material in a direction substantially normal to a major surface of the web. The web is then impregnated with a binding agent to bond the fibers of the web and the injected fibers. The injected fibers strengthen the web in the direction normal to the web major surfaces and, in the case where the web is constituted from two or more fibrous layers, interlinks the layers. The fibers can be injected by means of a compressed air blower or by electrostatic action between spaced electrodes.

3,615,968

METAL-METAL BONDING

Raymond John Ceresa, and Kenneth Martin Sinnott, both of London, England, assignors to W. R. Grace & Co., New York, N.Y.

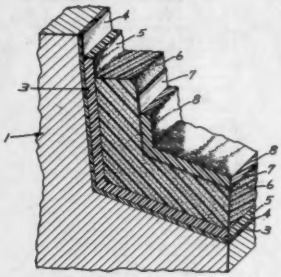
Filed Nov. 24, 1967, Ser. No. 685,476
Int. Cl. B32b *1/08*
U.S. Cl. 156—73 **4 Claims**



Metal to metal bonding using a heat-sensitive adhesive is effected by application of ultrasonic energy to a metal-

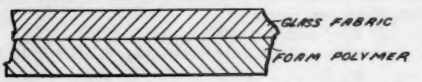
adhesive-metal assembly. The metals bonded may be, for example, sheets, strips, or the ends of a can blank, thus producing a side-seam.

3,615,969
FOAMED-CORE LAMINATES
Allan B. Hegg, Richmond, Va., assignor to Larson Industries Inc., St. Paul, Minn.
Filed May 20, 1968, Ser. No. 730,418
Int. Cl. B32b *5/18*
U.S. Cl. 156—78 **7 Claims**



Foamed-core laminates or sandwiches useful in the construction of pleasure boats comprise one or more layers of plastic foam sandwiched between layers of reinforced polyester. The laminates can be prepared by spraying a liquid, foam-producing substance on one side of a reinforced polyester skin or shell and thereafter spraying a thin coating of polyester over the previously applied foam while the foam is hardening and still tacky. This polyester coating forms an adherent skin on the foam and acts to firmly bond the final layer of reinforced polyester (when such is applied) to the foam core.

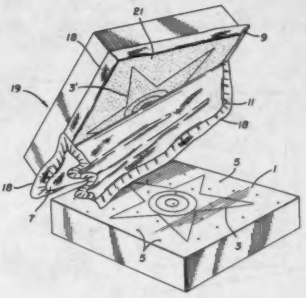
3,615,970
GLASS FIBER FABRIC FOR DRAPERY
Robert E. May, Greensboro, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.
Filed Jan. 10, 1969, Ser. No. 790,448
Int. Cl. B32b *5/18*
U.S. Cl. 156—78 **8 Claims**



A foam-laminated glass fabric is produced by forming a layer of foam vinyl chloride polymer on one side of a glass fabric, the layer being in the form of foam latex containing plasticizer for the polymer comprising flame retardant phosphate ester and polyethylene glycol bis 2-ethyl-hexoate. The latex is dried to below its normal equilibrium water content, and then the laminate is compressed and heated briefly to set the foam in its compressed configuration. The fabric is useful in the manufacture of drapery.

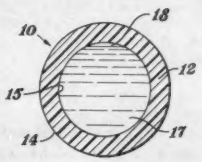
3,615,971
METHOD OF MAKING A SYNTHETIC SUEDE COVERED COMPOSITE ARTICLE
Glen D. Perry, Akron, Ohio, assignor to The General Tire & Rubber Company
Filed Aug. 21, 1969, Ser. No. 852,011
Int. Cl. B32b *5/18*
U.S. Cl. 156—78 **13 Claims**

This invention concerns a process of producing a synthetic suede covered composite article which comprises the steps of fabricating a flexible laminate comprising a layer of nonexpandable vinyl polymer and a layer of expanded vinyl polymer, forming the flexible laminate against a surface wherein the nonexpandable layer is adjacent the surface, applying a backing material to the formed laminate adjacent



the expanded layer to make a composite article, removing the composite article from the surface and stripping the nonexpandable layer from the expanded layer to produce a suede surface on the composite article.

3,615,972
EXPANSIBLE THERMOPLASTIC POLYMER PARTICLES CONTAINING VOLATILE FLUID FOAMING AGENT AND METHOD OF FOAMING THE SAME
Donald S. Morehouse, Jr., Midland, Mich., and Roland J. Tetreault, Springfield, Mass., assignors to The Dow Chemical Company, Midland, Mich.
Continuation-in-part of application Ser. No. 306,050, Sept. 3, 1963, now abandoned , Continuation-in-part of application Ser. No. 246,529, Dec. 21, 1962, now abandoned. This application Apr. 28, 1967, Ser. No. 634,691
Int. Cl. C08j *1/14, 1/26;* **B01j** *13/02*
U.S. Cl. 156—79 **48 Claims**

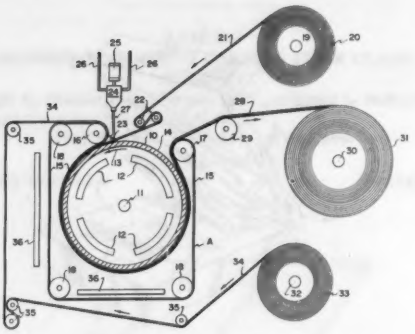


Thermoplastic microspheres are prepared which encapsulate a liquid blowing agent. Heating of the microspheres causes expansion. The microspheres are useful for coatings, moldings, plastic smoke, etc. Urnlike hollow microspheres are also shown. The expandable microspheres are prepared by a suspension-type polymerization of droplets of a mixture of monomer and blowing agent.

3,615,973
METHOD AND APPARATUS OF PRODUCING POLYURETHANE RESIN ON A SUBSTRATE
Ernest P. Meeder, c/o J. W. Johnson Co. 3100 W. Randolph, Bellwood, Ill.
Filed June 3, 1968, Ser. No. 733,910
Int. Cl. B32b *5/18*
U.S. Cl. 156—79 **8 Claims**

A method and apparatus of producing polyurethane resin on a substrate in a continuous manner in which the flowable at least partially unreacted resin is deposited in a thin stream in a back-and-forth movement between the substrate and a pressure web operating in conjunction with a rotating heated drum to set the resin to a solid after which the set resin and

substrate in the form of a flexible sheet are removed from the heated drum. The resin may be either foamed or unfoamed



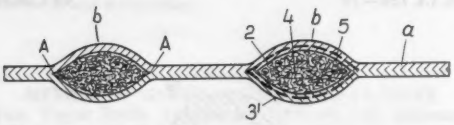
and the substrate may be either permanently attached to the resin or may be stripable therefrom.

3,615,974

PLATE-SHAPED STRUCTURAL ELEMENTS FILLED WITH EXPANDED MATERIAL

Roderich W. Graff, Kollwitzweg 19, Darmstadt-Arheilgen, Germany

Filed July 8, 1968, Ser. No. 743,204
Claims priority, application Australia, July 6, 1967, 6289/67
Int. Cl. B32b *5/18;* **B31d** *3/02*
U.S. Cl. 156—79 **6 Claims**



A structural element and a method of making the same. A plate member consists of a material having inherently low bending resistance and is provided with a plurality of spaced reinforcing ribs which project from at least one major surface of the plate member. The ribs are hollow and define internal passages. Bodies of solidified flowable material are introduced into and fill these passages for the purpose of reinforcing the ribs and thereby the plate member.

3,615,975

BONDING MATERIALS USING AMINE-MODIFIED ALDEHYDE CONDENSATION POLYMER, MIXTURE OF EPOXY RESIN AND METHYLENE DONOR, AND A FOAMING AGENT

Maurice F. Gillern, and Harlan G. Freeman, both of Seattle, Wash., assignors to Weyerhauser Company, Tacoma, Wash.

Filed May 5, 1969, Ser. No. 821,567
Int. Cl. C09j *3/16*
U.S. Cl. 156—79 **18 Claims**

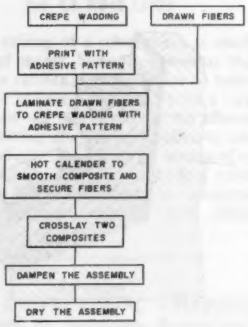
A method of bonding materials, particularly wood, using foamed gap-filling adhesives is disclosed. The adhesives are prepared using amine-modified aldehyde condensation polymers in which a foaming agent or agents have been incorporated. The resins cure rapidly at ambient temperature and make excellent construction adhesives.

3,615,976

METHOD OF PRODUCING A HIGH BULK MACRO-CREPE PRODUCT

Dan D. Endres, and Frank M. Lewis, Jr., both of Neenah, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Feb. 26, 1968, Ser. No. 708,097
Int. Cl. B32b *31/00*
U.S. Cl. 156—83 **5 Claims**


CREPE WADDING
DRAWN FIBERS
PRINT WITH ADHESIVE PATTERN
LAMINATE DRAWN FIBERS TO CREPE WADDING WITH ADHESIVE PATTERN
HOT CALENDER TO SMOOTH COMPOSITE AND SECURE FIBERS
CROSSLAY TWO COMPOSITES
DAMPEN THE ASSEMBLY
DRY THE ASSEMBLY

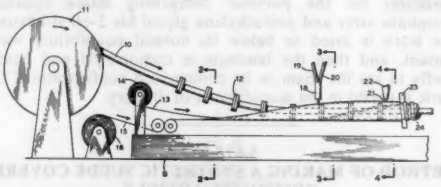
The production of a high bulk cellulosic wadding product which involves the dampening, preferably to a well wet stage, of creped padding secured by adhesive in well spaced zones to a drawn synthetic fiber web. The drawn fiber is substantially unaffected by the dampening while release of crepe distends the tissue between adhesive zones providing a macrocrepe structure on the creped tissue, the bulked nature of the tissue being retained upon subsequent drying. The process most suitably is carried out on an assembly of cross-laid composites of the tissue and fiber. The product is characterized particularly by bulk, strength and softness and has utility in applications such as that of facecloths.

3,615,977

METHOD OF INSULATING COAXIAL TUBING SYSTEMS

Gunther Lehnert, Hannover-Bothfeld; Gerhard Karl Ziemekm, Hannover; Fritz Otto Glander, Isernhagen, and Bern Otto Eilhardt, Vinnhorst, all of Germany, assignors to Kabel-und Metallwerke Gutehoffnung-shutte Aktiengesellschaft, Hannover, Germany

Filed Aug. 1, 1969, Ser. No. 846,858
Claims priority, application Germany, Aug. 8, 1968, P 17 79 406.8
Int. Cl. B32b *5/20*
U.S. Cl. 156—79 **9 Claims**



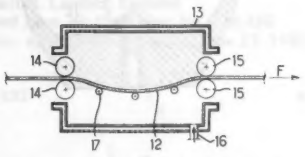
A method of insulating coaxial tubing systems for conveying heated or cooled gaseous or liquid materials by forming in situ a foamed insulating body disposed between the coaxial tubing members as they are formed.

3,615,978

PROCESSES FOR THE PRODUCTION OF FIBROUS STRUCTURES

Henri Robert Lissalde, Rouen, France, assignor to Papeteries Navarre, Paris, France

Filed Mar. 22, 1968, Ser. No. 715,324
Claims priority, application France, Apr. 4, 1967, 101,444
Int. Cl. B32b *31/24, 31/26*
U.S. Cl. 156—85 7 Claims



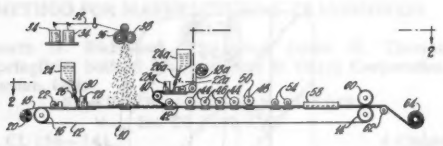
Process of and apparatus for the production of fibrous and/or like structures, the process comprising subjecting to a softening treatment and a shrinking treatment a fibrous base formed of at least two kinds of fibers one of the said kinds of fibers being retractile with respect to the other of said kind or kinds of fibers.

3,615,979

PROCESS OF MAKING SHEET MOLDING COMPOUND AND MATERIALS THEREOF

Carlton J. Davis, Sr., Newark; Richard P. Wood, Granville, and Everett R. Miller, Granville, all of Ohio, assignors to Owens-Corning Fiberglas Corporation

Filed July 1, 1968, Ser. No. 741,677
Int. Cl. B32b *31/00*
U.S. Cl. 156—87 15 Claims



The specification describes a process for making a sheet molding compound wherein a layer of resin-filler paste that includes a thickening agent and a hardening catalyst is put down upon a first layer of sheet material; a layer of glass fibers that are sized with a material which induces wet out is placed thereon; following which another layer of the resin-filler paste containing the catalyst is placed thereon and covered by a second layer of sheet material. The sandwich thus formed is fed into the bite of rollers which squeeze out air and compress the resin-filler paste around the sized fibers, following which the composite is placed under further compaction that includes a perforating means which forces needlelike members through at least one layer of the sheet material, through the resin-filled paste, and into the layer of fibers for the removal of remaining entrapped air. The glass fibers which are used are sized with a material that includes both a hardening resin, and a nonhardening resin. Specifically, the fibers are coated with an unsaturated polyester resin and a saturated polyester resin which are preferably deposited on the glass fibers as emulsified particles.

3,615,980

DECAL METALLIZATION OF CERAMIC SUBSTRATES

John F. Schuck, 12625 La Cresta Drive, Los Altos Hills, Calif.; Daniel J. Rose, 425 Poppy Drive, Mountain View, Calif., and Chan Huan Wang, 19685 Via Escuela, Saratoga, Calif.

Continuation-in-part of Ser. No. 679,972, Nov. 2, 1967, abandoned
Filed Feb. 12, 1970, Ser. No. 11,021
Int. Cl. C04b *37/00*
U.S. Cl. 156—89 6 Claims

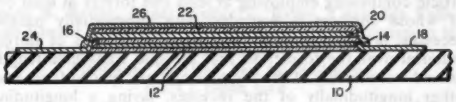
A process for applying a metal pattern to a ceramic substrate by applying to the substrate a decal having a metal pattern admixed with a removable binder. The substrate and decal are then heated in a two step heating cycle, first to remove the binder from the metal pattern and second to bond the metal pattern to the substrate.

3,615,981

METHOD OF MANUFACTURING ELECTRICAL CAPACITORS

Charles R. Pratt, Jr.; Stewart G. Stalnecker, Jr., Raleigh, N.C., and Walter H. Tarcza, Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed May 18, 1965, Ser. No. 456,616
Int. Cl. C04b *33/34*
U.S. Cl. 156—89 4 Claims



A method of making electrical capacitors fused to a substrate and suitable for integration with a microcircuit comprising applying to the substrate in the order named a first buffer layer and a capacitor unit including a first capacitor plate, dielectric layer, and second capacitor plate. The assembly so formed is then fired to volatilize any organic constituents, fuse adjoining layers and plates to each other and to the adjoining portions of the substrate, and at least partially crystallize the buffer and dielectric layers. Thereafter, a second buffer layer and a layer of vitreous glazing material is applied over the capacitor unit and the assembly is fired again to volatilize any organic constituents, complete crystallization of the first buffer and dielectric layers, crystallize the second buffer layer, and fuse the newly applied layers to adjoining layers, to the adjoining exposed surface of the outer capacitor plate, and to the adjoining portions of the substrate.

3,615,982

CORE FOR USE IN THE MANUFACTURE OF FURNITURE AND METHOD OF MANUFACTURE OF CORE

Henry Bandremer, 1435 Hagys Ford Road, Narberth, Pa., and Irving L. Bandremer, 1214 Sandringham Road, Bala Cynwyd, Pa.

Filed Oct. 30, 1969, Ser. No. 872,601
Int. Cl. B32b *33/00*
U.S. Cl. 156—90 6 Claims

A core for use in the manufacture of furniture which comprises a plurality of superimposed thin, flexible sheets which have been adhesively secured together, and then formed into a U-shaped core, with the core being used in the manufacture of furniture, for instance, as the backing portion of a chair.

The core is manufactured by superimposing a plurality of thin, flexible sheets, one upon the other, by high speed equipment, and simultaneously applying adhesive to the sheets as the superimposition process proceeds to form a stack.

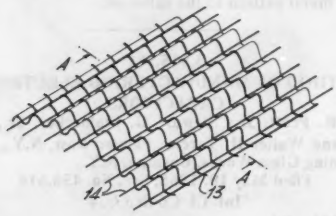
The stack is then positioned in matched pressure dies and with the action of pressure the core of the present invention is formed into a U-shape, although many other shapes are contemplated.

3,615,983

METHOD OF PRODUCING A FIBROUS ARTICLE

Jack Palfreyman, and Henry Edward Middleton, both of Derby, England, assignors to Rolls Royce Limited, Derby, England

Filed Mar. 27, 1970, Ser. No. 23,174
Claims priority, application Great Britain, Apr. 2, 1969, 17,238/69
Int. Cl. B65h *81/02, 57/04;* D04h *3/08*
U.S. Cl. 156—93 **11 Claims**



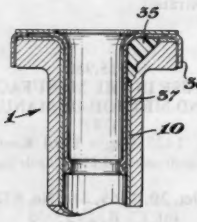
The invention concerns a method of producing a fibrous article comprising employing at least one former at least one of whose surfaces is provided with substantially parallel recesses, laying a plurality of transverse lengths of fibrous material over the former so that the said transverse lengths extend transversely of the recesses and are spaced from each other longitudinally of the recesses, laying a longitudinal length of fibrous material in each said recess so that the said longitudinal lengths extend over the said transverse lengths and force respective portions of the latter into the recesses, forming at least one fibrous assembly having the shape of the respective said surface by bonding the transverse and longitudinal lengths together while the latter are on the former, and effecting relative separation between the said assembly and the former.

3,615,984

METHOD OF REPAIRING A DAMAGED VITREOUS COATED NOZZLE

Raymond Burt Chase, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 26, 1968, Ser. No. 724,564
Int. Cl. F16l *9/14*
U.S. Cl. 156—94 **1 Claim**



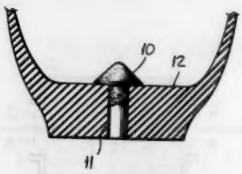
A method of repairing a damaged nozzle and a shield conforming to undamaged profile and made of corrosion resistant metal preferably tantalum, characterized by a returning exterior flange and a crimped interior flange and adapted to be formed of sheet tantalum: used to restore conformation and repair damage to a nozzle of a glass-lined chemical reaction vessel; in conjunction with filler and cementitious resins.

3,615,985

TUBELESS TIRE REPAIR PLUG INSERTION TECHNIQUE

Franklin G. Reick, 228 W. Place, Westwood, N.J., and Robert S. Hanser, P.O. Box 338, Saddle River, N.J.

Filed Feb. 5, 1969, Ser. No. 796,712
Int. Cl. B60c *21/06*
U.S. Cl. 156—95 **5 Claims**



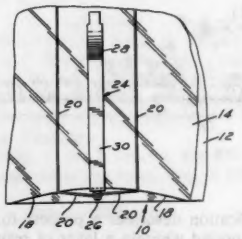
A repair plug insertable by a pneumatic gun or other tool into a puncture formed in the casing of a tubeless tire, thereby to seal the puncture. The plug is constituted by a core of cured rubber coated with a tacky layer of vulcanizable rubber which, when subjected to the heat produced by a running tire, vulcanizes in place and bonds to the tire casing. Before being inserted in the puncture, the plug is coated with a temporary detackifying compound which lubricates the passage of the plug through the inserting tool. The compound is dissolvable in rubber when subjected to the heat of the running tire so that it disappears in the plug and the bonding action of the tacky coating thereon is permitted to proceed.

3,615,986

METHOD OF MAKING AN IMPROVED WINDSHIELD ANTENNA SYSTEM

Richard T. Dickason, Birmingham, and John A. Richardson, Harper Woods, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 9, 1970, Ser. No. 9,814
Int. Cl. C03c *27/12*
U.S. Cl. 156—105 **5 Claims**



A windshield antenna system includes a first sheet of glass, a second sheet of glass and an interlayer of resinuous material bonding the two glass sheets together. A pair of antenna wires are adhered to the interlayer for most of their length. However, the antenna wires do have free ends projecting outwardly from between the bonded glass sheets at a cutout portion of the second glass sheet. A terminal having a first end portion defining a projecting neck, a main body portion and a second end portion defining a connector tip is formed from a conductive material. At least the body portion of the terminal is bonded to the exposed surface of the second glass sheet with the portion of the terminal defining the projecting neck extending to a position which is located over the cutout portion of the second glass sheet. The free ends of the antenna wires are wrapped around the projecting neck of the terminal. The wrapped wires and the projecting neck of the terminal are deformed into the space provided by the cutout portion of the second glass sheet. An electrical junction of high quality is formed between the wrapped antenna wires and the terminal by applying solder thereto. Any extraneous

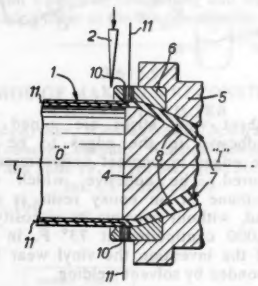
antenna wire is cut off. The space into which the projecting neck of the terminal and the wrapped antenna wires are deformed is sealed by a sealing material. The main body portion of the terminal is also sealed by a sealing material.

3,615,987

METHOD FOR MANUFACTURING ANNULAR SEAMLESS RUBBER OR RUBBERLIKE COMPONENTS FOR USE IN THE MANUFACTURE OF PNEUMATIC TIRES

Karl Blatz, Steinheim am Main, and Otto Schmitt, Niedergrundau, both of Germany, assignors to Dunlop Holdings Limited, London, England

Filed June 20, 1968, Ser. No. 738,480
Claims priority, application Germany, June 23, 1967, D 53 418
Int. Cl. B29h *17/20*
U.S. Cl. 156—133 **6 Claims**



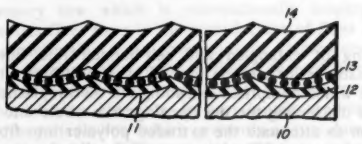
A method of manufacturing an annular seamless component of rubber or plastics material for use in for example pneumatic tires comprising extruding a tube of said material, cutting the extruded tube in the length, and positioning the said lengths onto a building former of which the following is a specification.

3,615,988

METHOD FOR MANUFACTURING TRANSMISSION BELTS

Kenneth D. Richmond, Nixa, and James R. Thomas, Springfield, both of Mo., assignors to Dayco Corporation, Dayton, Ohio

Filed Feb. 25, 1969, Ser. No. 802,059
Int. Cl. B29h *7/22*
U.S. Cl. 156—141 **4 Claims**



A V-belt having an arched outer surface and arcned neutral axis strength cords, and the method of manufacturing the same in sleeve form. The belt sleeve is built in an inverted manner on a drum having arched grooves on the surface and cut after curing along cut lines spaced in accordance with the groove spacing.

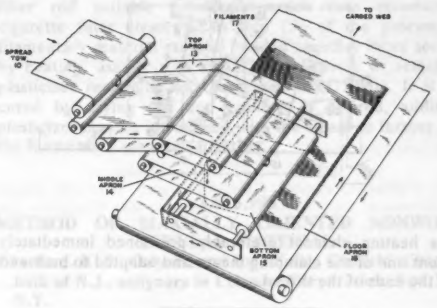
3,615,989

NONWOVEN FABRIC STRUCTURE

Ronald L. Depoe, Parsippany, N.J., assignor to J. P. Stevens & Co., Inc., New York, N.Y.

Filed May 9, 1967, Ser. No. 637,121
Int. Cl. B32b *31/14*
U.S. Cl. 156—148 **5 Claims**

A process for producing a novel nonwoven fabric structure by cross-lapping a deregistered tow of continuous multifilament synthetic fibers to form a plurality of layers wherein the filaments in each layer are disposed in substantially parallel relation with respect to each other and



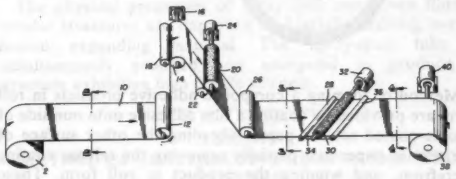
are angularly disposed with respect to filaments of adjoining layers, adding thereto a web of lower-melt thermoplastic fibers, and thereafter heating the entire structure to bond the fibers.

3,615,990

SURFACE CHARACTERISTICS OF COMPOSITE FABRICS

Eugene B. Butler, Kent; Walter T. Reilly, Cuyahoga Falls, and Gerald E. Whorley, Ashtabula, all of Ohio, assignors to The General Tire & Rubber Company

Filed July 23, 1969, Ser. No. 844,010
Int. Cl. D04h *1/46*
U.S. Cl. 156—148 **4 Claims**



In the production of a substitute leather material, a laminate of a nonwoven batt needled to the backside of a knit or woven fabric is often used as a substrate or support. During needling, loops and strands of the batt are drawn through the fabric by the needles, resulting in a large number of fiber ends and loops projecting from the surface and forming a visible linear pattern. The surface of the fabric is brushed at an acute angle to the pattern of the projections to mask the pattern and level the projections thereby producing a smoother, more uniform surface finish. Buffing of the surface prior to brushing serves to break the projecting loops thereby facilitating the brushing operation.

3,615,991

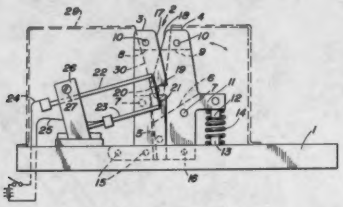
METHOD FOR UNITING THREAD ENDS

Richard Munzner, Obernburg am Main, Germany, assignor to Glanzstoff AG, Wuppertal, Germany

Filed Feb. 18, 1969, Ser. No. 800,049
Claims priority, application Germany, Feb. 24, 1968, P 17 10 460.8
Int. Cl. D04d *1/02*
U.S. Cl. 156—148 **6 Claims**

Method of uniting the ends of thermoplastic threads or yarns by twisting the ends over a short length with the twisted length being clamped and held under tension and applying heat to a relatively small area of the twisted length so as to melt and bond the threads together as they are simultaneously caused to untwist under the release of

tension. The method essentially includes two clamping means adapted to receive and hold the twisted length of threads,



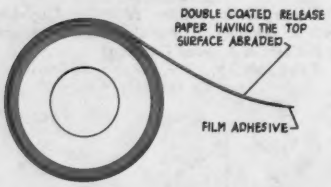
and a heating element preferably positioned immediately adjacent one of the clamping means and adapted to melt and bond the ends of the thread.

3,615,992

METHOD OF PRODUCING ADHESIVE PRODUCTS

Robert Jeffries, East Hanover, and Martin M. Grover, Upper Montclair, both of N.J., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 12, 1968, Ser. No. 720,868
Int. Cl. C09j *7/02*
U.S. Cl. 156—154 **7 Claims**



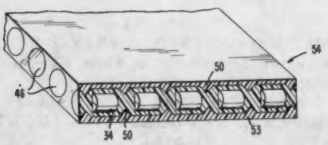
Method of forming a composite adhesive products in roll form are provided by coating a film adhesive onto one side of double-coated release paper, abrading the other surface of the release paper and partially removing the release coating therefrom, and winding the product in roll form. These products are useful in a process in which a pressure-sensitive adhesive tape is applied to the abraded surface of the release paper, thereby making separation of the release paper from the adhesive easily accomplished during use.

3,615,993

MAGNETIC BALL PRODUCTION METHOD

Walter K. French, Montrose, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed July 14, 1967, Ser. No. 653,397
Int. Cl. B431 *1/12*
U.S. Cl. 156—155 **7 Claims**



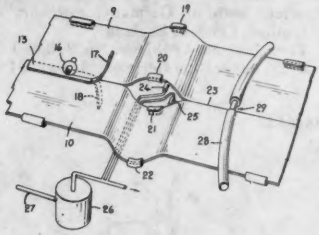
Method of making a sheeting material which is capable of having graphic subject matter produced thereon and erased therefrom by a magnetic stylus and wherein one sheet of the material can have reproduced thereon graphic subject matter present on another sheet.

3,615,994

METHOD OF JOINING THE EDGES OF CUSHIONED VINYL SHEET MATERIAL

Ian A. MacLaine, Lachine, Quebec, and Peter G. Montgomery, Montreal, Quebec, both of Canada, assignors to Domco Industries Limited, Montreal, Quebec, Canada

Filed June 12, 1969, Ser. No. 832,797
Int. Cl. B31f *5/06*
U.S. Cl. 156—159 **17 Claims**



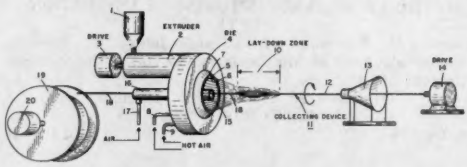
Composite sheet vinyl strips are joined together by applying an adhesive to the edges to be joined, and maintaining the edges in contact underpressure until the adhesive is cured. The adhesive, which may be an elastomeric urethane or an epoxy resin, is applied as a continuous bead, without solvent; its viscosity is between 5,000 and 80,000 centipoises at 73° F. In a particular embodiment of the invention the vinyl wear layers of the strips are first bonded by solvent welding.

3,615,995

METHOD FOR PRODUCING A MELT BLOWN ROVING

Robert R. Buntin; John W. Harding; James P. Keller, and Vollie L. Murdock, all of Baytown, Tex., assignors to Esso Research and Engineering Company

Filed Aug. 14, 1968, Ser. No. 752,592
Int. Cl. B65h *51/00*
U.S. Cl. 156—161 **13 Claims**



A roving of entangled and self-bonded fine fibers of thermoplastic resins may be formed by a melt blown roving technique which comprises extruding the thermoplastic resin through a die having the die openings in a circle into a hot gas stream to attenuate the extruded polymer into fibers in the form of a cone of fibers in space and collecting the fibers as a tow. The process yields many unique products which vary in characteristics depending on the specific collection of the fibers.

3,615,996

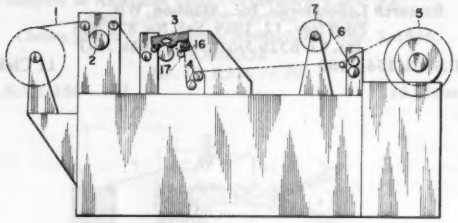
SEALING METHOD OF POLYETHYLENE FILMS

Kazumasa Hasegawa, and Yasuzi Hosono, both of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Oct. 13, 1969, Ser. No. 866,795
Claims priority, application Japan, Oct. 12, 1968, Nov. 7, 1968, 43/73913 and 43/81079
Int. Cl. B32b *31/18, 31/16*
U.S. Cl. 156—164 **9 Claims**

A method of sealing polyethylene films which comprises feeding to a sealing slit section piled polyethylene films,

prepared by an inflation molding method and having a blow ratio of greater than 2, in the tensioned state at a stress higher than the heat shrinking stress of the polyethylene film

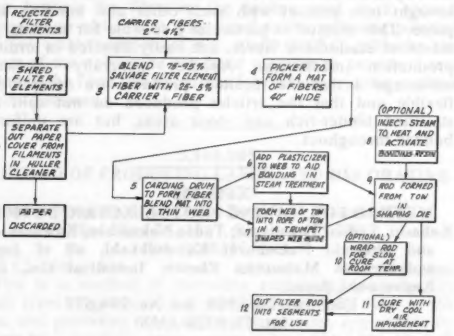


in the sealing direction and lower than the stress required to stretch said film 3 percent, and slitting and welding said films while maintaining them in the tensioned state.

3,615,997
METHOD OF MAKING A RECONSTITUTED CIGARETTE FILTER

Colin Shaw McArthur, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed June 19, 1968, Ser. No. 738,139
Int. Cl. B32b *31/00*
U.S. Cl. 156—166 **3 Claims**

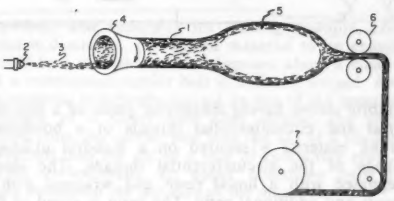

REJECTED FILTER ELEMENTS
CARRIER FIBERS 2"-4½"
SHRED FILTER ELEMENTS
BLEND 75-95% SALVAGE FILTER ELEMENT FIBER WITH 25-5% CARRIER FIBER
PICKER TO FORM A MAT OF FIBERS 40" WIDE
SEPARATE OUT PAPER COVER FROM FILAMENTS IN HOLLER CLEANER
(OPTIONAL) INJECT STEAM TO HEAT AND ACTIVATE BINDING RESIN
PAPER DISCARDED
ADD PLASTICIZER TO WEB TO AID BONDING IN STEAM TREATMENT
CARDING DRUM TO FORM FIBER BLEND MAT INTO A THIN WEB
ROD FORMED FROM TOW IN SHAPING DIE
FORM WEB OF TOW INTO ROPE OF TOW IN A TRUMPET SHAPED WEB GUIDE
(OPTIONAL) WRAP ROD FOR SLOW CURE AT ROOM TEMP.
CUT FILTER ROD INTO SEGMENTS FOR USE
CURE WITH DRY COOL AIR IMPINGEMENT

Method of manufacture of cigarette filter elements which permits the utilization of short cuts or staples of the same filamentary tow which is conventionally employed in a continuous fiber form in the manufacture of filter elements. More specifically, these short cuts or staples comprise in total or in part recovered cut fibers derived from salvage bundles of such fibers bound together in the form of porous rod-shaped filter elements. In part longer segments of cut filamentary staple tow which presently accumulate as waste in the manufacture of filamentary bundles are also employed. The method essentially comprises: (1) shredding reject rod-shaped fibrous cigarette filter elements to fracture the bonding therein and separate the short fiber contents into individual filaments which are generally about 20 mm. long; (2) blending a major proportion of the order of 75 percent–95 percent cut fibers from filter element rejects with a minor proportion of the order of 25 percent or less cut staple fibers resulting from waste or random cut fibers accumulated in the manufacture of the filter elements. These latter fibers are normally about twice the length from about 40 to 100 mm.; (3) forming this blend of fibers into a mat of random directional fibers characterized in that the two groups of staple fibers in the blend are physically interlocked with the longer fibers acting as a carrier fiber for the shorter fibers derived from the shredded filter elements; (4) rolling the mat of commingled fibers on a mandrel to shape a lap which is fine picked on a carding machine to reduce the thickness of the mat to a web of fibers which is about 1/16 inch in thickness; (5) adding plasticizer if needed and drawing this web of fibrous material through a rod-forming means capable of transforming it into a continuous circular fiber rod suitable for segmentation into reconstituted cigarette filter elements. In step (5) of the process, the filamentary material may be bonded together more securely by heating, usually with steam, to reactivate or remelt the plasticizer remaining on the reused filter fibers. It is then cured by drying (6) and cooling. If desired, additional plasticizer may be introduced with the steam to further bond the filamentary materials together.

3,615,998
METHOD OF BIAXIALLY ORIENTED NONWOVEN TUBULAR MATERIAL

Charles J. Kolb, Colonia, and Dale Kelley Canfield, Chatham, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed July 10, 1968, Ser. No. 743,862
Int. Cl. D04h *3/07*
U.S. Cl. 156—167 **7 Claims**

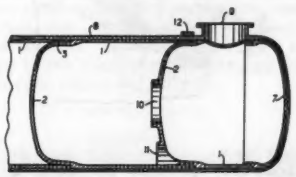


The physical properties of spray-spun nonwoven fibrous tubular structures are improved by biaxially drawing over a heated expanding mandrel. The spray-spun tube is simultaneously enlarged and elongated to produce a structure exhibiting high tensile strength.

3,615,999
METHOD OF CONSTRUCTING COMPARTMENTED TANKERS

Robert Basier, Saudemont, and Clovis Parisot, Douai, both of France, assignors to Societe Anonyme de Recherches et de Commercialisation de Produits de Resines de Synthese R.C.P. and Houilleres du Bassin du Nord et du Pas de Calais, Douai (Nord), France

Continuation-in-part of application Ser. No. 471,171, July 19, 1965, now abandoned. This application Apr. 3, 1969, Ser. No. 837,970
Int. Cl. B65h *81/06*
U.S. Cl. 156—172 **1 Claim**



A method of producing compartmented tankers from laminated resins, in which the tankers include tubular elements of substantially identical cross section and of cylindrical shape with one end open, which comprises the steps of assembling the tubular elements to fit hermetically into each other in the same direction over a limited depth, to form separate compartments. The compartments are first molded of polyester resin and covered with glass fiber. The

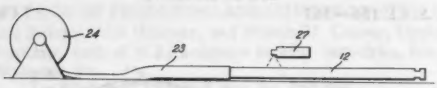
glass is present at the order of about 50 percent. The polyester is non-saturated and has catalyzers and accelerators added thereto. The polymerization is performed at first at an ambient temperature and terminates then by heating to about 80° C, in order to obtain a total reticulation. The assembly step is performed by moistening that part of the tubular elements in contact with each other with glue of the same polyester resin catalyzed and accelerated as applied before. The last one of the elements is hermetically closed towards the outside by an end member.

3,616,000

SEAMLESS FABRIC-LINED BEARING OF MULTIPLE-LENGTH CONSTRUCTION

Neil William Butzow, Greendale, and Bernard Harris, Milwaukee, both of Wis., assignors to Rex Chainbelt Inc., Milwaukee, Wis.

Filed May 20, 1968, Ser. No. 730,399
Int. Cl. B65h *54/10*
U.S. Cl. 156—176 **7 Claims**



A fabric sleeve having lengthwise yarns of a low-friction material and circumferential threads of a bondable but unshrunk material is secured on a mandrel utilizing the shrinkage of the circumferential threads. The sleeve is impregnated with a liquid resin and wrapped with glass filaments and additional resin. The resin is cured to form a rigid tube. When the mandrel has been withdrawn the tube has an internal bearing surface a predetermined size larger than the mandrel and may be cut to selected lengths to comprise the desired bearings

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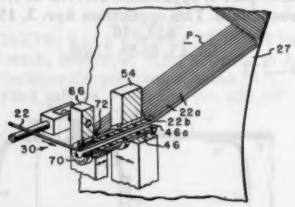
3,616,001

VIBRATORY METHOD FOR SECURING A CONTINUOUS THREAD ON A SUPPORT SURFACE

Kenneth J. Addis, Spartanburg, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Filed May 20, 1968, Ser. No. 730,301
Int. Cl. B32b *5/12*; **B29h** *17/28*
U.S. Cl. 156—177 **9 Claims**



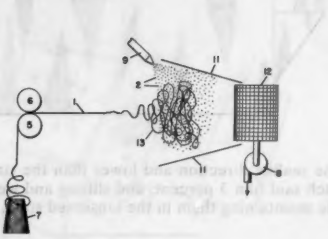
A method and apparatus for securing at least one continuous length of thread on a support surface in a desired pattern, wherein the thread and support surface have a pressure sensitive adhesive affinity for each other, and wherein the thread is longitudinally laid on the support surface from a thread guide mechanism moving relative to the support surface while a pressure is intermittently applied against the thread closely adjacent its lay point to minimize movement of the thread on the surface due to tension forces acting on the thread and to minimize damage or dislocation of the thread due to frictional engagement with the thread guide mechanism.

3,616,002

METHOD OF MAKING NONWOVEN ARTICLES FROM CONTINUOUS FILAMENTS

Elmer Gordon Paquette, Madison, and Karl Russell Guenther, Middleton, both of Wis., assignors to Bjorksten Research Laboratories, Inc., Madison, Wis.

Filed Nov. 12, 1969, Ser. No. 876,005
Int. Cl. B32b *5/02, 5/04*; **D04h** *3/03*
U.S. Cl. 156—180 **11 Claims**



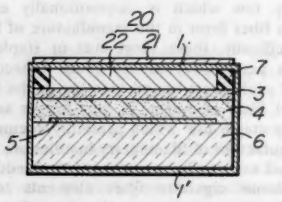
This invention deals with nonwoven articles made from continuous filaments, including garments and porous sheet materials. In the past, nonwoven products have suffered the handicap of a stiff and "boardy" feel. We eject continuous yarn or filaments in an air space and contact them with binder droplets while still suspended in air, so that the droplets dry sufficiently to become nonmigrating before they are deposited on the screen or mold on which the fibers are brought into contact with each other and bonding takes place. This method is particularly suitable for making garments of elastomeric fibers, not easily handled in ordinary production machinery. Another generally applicable advantage is that the resultant products are exceptionally flexible and that the articles produced do not split into stratified binder-rich and -poor areas, but are uniformly bonded throughout.

3,616,003

METHOD FOR MAKING PHOTOELECTRIC DEVICE

Kohashi, Tadao, Yokohama; Tadao Nakamura, Kawasaki-shi, and Shigeaki Nakamura, Kawasaki-shi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma-shi, Japan

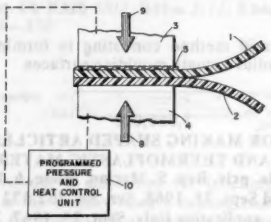
Filed Jan. 28, 1969, Ser. No. 794,677
Int. Cl. B32b *31/00*
U.S. Cl. 156—182 **3 Claims**



A method for manufacturing a photoelectric device having a plurality of photoconductive layers comprising the steps of forming on a surface of a semimanufactured article a layer of mixed suspension material consisting of powdery photoconductive material, binder material and volatile diluent, volatilizing said volatile diluent, repeating these steps to laminate the desired number of layers, and subjecting the laminated layers to a single heat treatment, thereby to set the photoconductive layers simultaneously.

A photoelectric device including a spacer frame between the electrodes, said frame encircling at least one photoconductive layer.

3,616,004
METHOD FOR SEALING MULTILAYER THERMOPLASTIC FILMS
Sigbert Samson, Rozendaal, Gelderland, Netherlands, assignor to American Enka Corporation, Enka, N.C.
Filed Apr. 2, 1969, Ser. No. 812,601
Claims priority, application Netherlands, Apr. 2, 1968, 6,804,634
Int. Cl. B32b *31/00*
U.S. Cl. 156—182 12 Claims

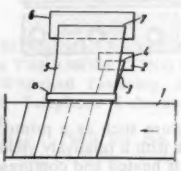


A method for sealing at least two multilayer polymeric films each being built up of two or more alternating layers of different thermoplastic component polymers, e.g., polyethylene and polyamide, which includes the steps of applying pressure to at least two of the multilayer films arranged to be sealed together in a sealing area, simultaneously heating the films in the area to a first temperature which is at least equal to the softening point of the polyethylene component, but lower than the softening point of the polyamide component, e.g., about 140° C., and then heating the films in the sealing area to a second temperature which is at least equal to the softening point of the polyamide component, e.g., about 220° C., whereby the layers of the polyamide are fused together to provide a seal between the films. An apparatus for carrying out this method is also disclosed.

3,616,005
METHOD OF PRODUCING LAMINATED DECORATIVE OBJECTS
Janet M. Wetstone, 1041 Crane Road N.E., Atlanta, Ga.
Filed Mar. 24, 1967, Ser. No. 625,789
Int. Cl. B31f *1/12*
U.S. Cl. 156—183 16 Claims

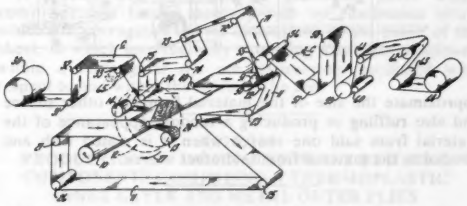
This is a method of mounting engravings, etchings, or other types of prints on any surface, laminating them to the base, and providing them with an oil painting appearance by means of a synthetic resin emulsion latex, and the product produced thereby. The method is an improvement over the old French art form "decoupage."

3,616,006
METHOD OF ENVELOPING A STEEL PIPE
Helmut Landgraf, Rumeln Kreis, Moers, and Walter Quitmann, Angermund, both of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany
Filed July 7, 1969, Ser. No. 839,518
Claims priority, application Germany, July 5, 1968, P 17 71 764.5
Int. Cl. B65h *81/02*
U.S. Cl. 156—188 3 Claims



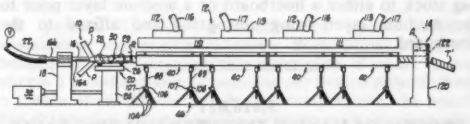
A method of enveloping a steel pipe includes the simultaneous winding of the heated pipe with a twin layer of two materials in screw thread fashion. The outer material is a thermoplastic synthetic sheet, and the inner material an adhesive strip.

3,616,007
METHOD FOR CONTROLLING AND TRANSFERRING CROSSLAID SHEETS
Dean K. Anderson, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.
Filed Feb. 28, 1969, Ser. No. 803,245
Int. Cl. B65h *81/04*
U.S. Cl. 156—190 10 Claims



A method and apparatus for making multiply, crosslaid material is disclosed. The ply of material to be crosslaid is deposited by a rotatable carrier disposed about a mandrel on which a continuous carrier belt is helically wound. Another ply of material is helically wound on top of the crosslaid ply in advance of a slitter and, after slitting, the plies are separated from the carrier belt with the aid of a vacuum roll and directed into the nip of a pair of combining rolls. In its preferred embodiment, an upper holddown belt is also helically wound on the last turn of the mandrel.

3,616,008
METHOD AND APPARATUS FOR MAKING A HELICALLY WOUND TUBE
Paul W. Stump, North Olmstead; James A. Huber, Strongsville, and John M. Lipinski, Cleveland, all of Ohio, assignors to Clevepak Corporation, Cleveland, Ohio
Filed Apr. 30, 1969, Ser. No. 820,462
Int. Cl. B65h *81/03*
U.S. Cl. 156—190 6 Claims

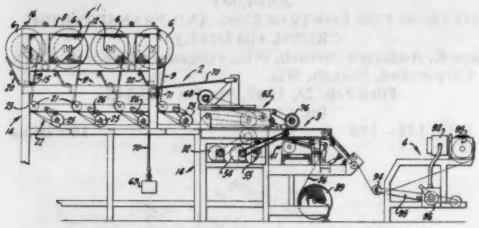


Fibrous strip material impregnated with a hardening material is wound on a hollow open-ended mandrel, continuously advanced through and cured in an in-line infrared heating apparatus and cut into separate lengths after curing. A vacuum applied to the mandrel withdraws gases and vapors from within the tube, enhancing the curing.

3,616,009
DECORATIVE SHEETING FABRICATING METHOD
Lee F. Rost, and William H. Taylor, both of Covina, Calif., assignors to Koningsplein, N. V.
Division of Ser. No. 715,677, Mar. 25, 1968. Filed June 8, 1970, Ser. No. 44,346
Int. Cl. B31f *1/28*
U.S. Cl. 156—210 4 Claims

A method for forming decorative sheeting which include means for bringing two independent sources of thin, flexible material to a single point for continuously forming such sheeting. The process of forming such sheeting includes the use of two separate bonding materials, one of which is quick acting but forms only a temporary bond and the other of

which is slow acting, but forms a permanent bond between the materials from the two separate sources. The process also reduces the size of the material from one source to



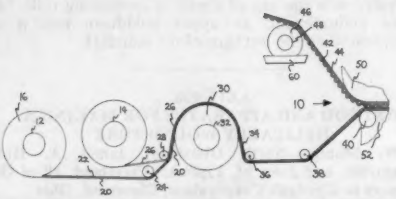
approximate the size of the material from the other source and also ruffling or producing a random appearance of the material from said one source when it is mated with and bonded to the material from said other source.

3,616,010

MOISTURE-BARRIER CORRUGATED PAPERBOARD AND ITS METHOD OF MANUFACTURE

Harry E. Dunholter, and James C. Jones, both of Toledo, Ohio, assignors to Owens-Illinois, Inc.

Filed Dec. 31, 1968, Ser. No. 788,253
Int. Cl. B31f *1/20*
U.S. Cl. 156—210 **2 Claims**



A method of manufacturing a sheet of moisture-barrier, thermoplastic, laminated, corrugated paperboard which includes the lamination of a layer of thermoplastic-coated bag stock to either a linerboard or a medium layer prior to the medium layer being corrugated and affixed to the linerboard.

3,616,011

PROCESS OF MAKING TEXTURED MOLDING CAULS

Gilbert D. Endrizzi, Wisconsin Rapids, Wis., assignor to Consoweld Corporation, Wisconsin Rapids, Wis.

Filed Dec. 4, 1968, Ser. No. 781,010
Int. Cl. B31f *7/00*
U.S. Cl. 156—219 **4 Claims**

Process of making textured molding cauls from normally consumable textured originals comprising the steps of sandwiching a consumable textured original between a pair of thin flexible resin impregnated sheets, forcing said sheets intimately into the surface recesses of said original, setting the resin in said sheets, and using the resin-set sandwich of said original and said sheets as a master molding caul.

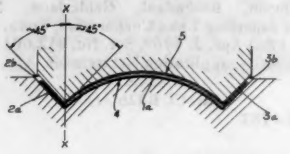
3,616,012

PLASTIC LAMINATES BENDING METHOD

Antonio Salvarani, Baganzola, Parma, Italy, assignor to Salvarani Societa in nome Collettivo, Parma, Italy

Filed Feb. 14, 1968, Ser. No. 705,336
Claims priority, application Italy, Feb. 20, 1967, 12837
Int. Cl. B31f *1/00*
U.S. Cl. 156—222 **2 Claims**

This invention refers to a method and machine for producing plastic laminate elements having a plurality of flat faces at substantially right angles to each other and with



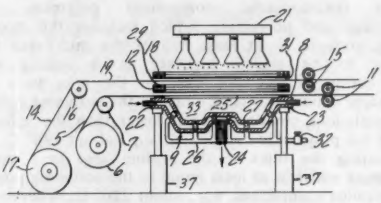
sharp corners, said method consisting in forming said flat faces on wide radius arcuate moulding surfaces.

3,616,013

PROCESS FOR MAKING SHAPED ARTICLES FROM CLOTH AND THERMOPLASTIC MATERIAL

Luigi Bocchi, Via. priv. Rep. S. Marino, Milan, 6, Italy

Filed Sept. 25, 1968, Ser. No. 762,572
Claims priority, application Italy, Sept. 25, 1967, 20866A/67
Int. Cl. B31j *1/00*
U.S. Cl. 156—224 **1 Claim**



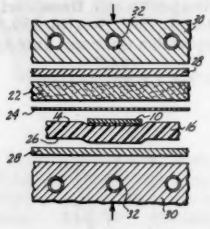
A process for forming composite plastic and fabric articles to a desired shape wherein a sheet of thermoplastic material and a stretchable fabric are separately supported in spaced generally parallel planes over a forming surface with the fabric closer than the sheet to the forming surface. The sheet is heated to a pliable state and forced toward the molding surface to carry the fabric as well as the sheet into conforming relation with the mold surface. The resulting shaped object is chilled in the mold into a rigid condition under which it may be removed and trimmed or vice versa.

3,616,014

MANUFACTURE OF PRINTED CIRCUIT BOARD

Walter Weglin, 10758 22nd Ave. S.W., Seattle, Wash.

Filed May 15, 1968, Ser. No. 729,346
Int. Cl. B32b *31/04*
U.S. Cl. 156—228 **9 Claims**



A composite structure such as a printed circuit board is stacked back-to-back with a relatively yieldable backing in a press, and the stack is heated and compressed by applying a heated platen to the face of the structure on the opposite side thereof from the backing, so as to flatten the latter face while imparting a smooth unbroken contour to the strip-bearing face of the structure. Under the conditions of compression

the backing is nonlaminable with the structure and after the compression step is relatively removed from the same.

3,616,015

CLEAR HEAT TRANSFER AND METHOD OF APPLYING THE SAME

Katherine A. Kingston, c/o Dennison Manufacturing Co., Framingham, Mass.

Continuation-in-part of application Ser. No. 602,758, , now abandoned. This application Aug. 11, 1969, Ser. No. 857,268

Int. Cl. B32b *9/02*; B41m *3/12*; B44c *1/16*

U.S. Cl. 156—230 **10 Claims**

A heat transfer is described for labelling clear plastics which uses as the transfer layer a coating comprising at least 30 percent by weight of an oxidized, esterified, partially saponified montan wax. An ink image is printed over the wax and, after transfer by application of heat and pressure, is smoothed, clarified and glossed by exposure to a jet of hot gas or other heating means to remelt the transferred wax, followed by solidification in the clear state.

3,616,016

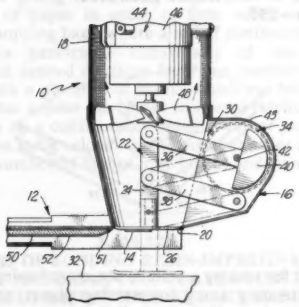
LABELING METHOD AND LABEL APPLICATOR

Herbert Dinter, 1300 S. Shadydale, West Covina, Calif.

Filed Feb. 17, 1969, Ser. No. 799,690

Int. Cl. B44c *1/00*; B32b *31/10*

U.S. Cl. 156—238 **4 Claims**



A labeling method and label applicator are provided for applying pressure sensitive labels to articles such as cartons and the like. Each label is located in an initial position directly in front of an applicator plunger to which the label is caused to adhere by suction when the plunger occupies its normal retracted position. The label is applied to an article positioned in the path of the plunger by extending the plunger into contact with the article at a high velocity such that the air drag and inertial forces active on the label cause the label to adhere to the plunger to the end of its extension stroke, where the label is pressed firmly into adhesive bonding contact with the article.

3,616,017

METHOD OF BONDING A LAYER OF INORGANIC MATERIAL TO A THERMOSETTING SILICONE LAYER

Austin L. Tyler, Whitehall Township, Lehigh County, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 1, 1968, Ser. No. 725,778

Int. Cl. B29c *19/00*

U.S. Cl. 156—242 **9 Claims**

Joints between inorganic materials and thermosetting silicone plastics sufficient to withstand thermal cycling are achieved by inserting a layer of two-part room temperature vulcanizing silicone rubber between the materials, thereby allowing the relieving of strains at the joint caused by their differing thermal expansivities.

3,616,018

METHOD OF MAKING A STRUT EXTRUDED SHEET

Thomas John Komoly, London, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Apr. 19, 1967, Ser. No. 632,016

Claims priority, application Great Britain, May 25, 1966, 23405/66

Int. Cl. B29c *19/00*

U.S. Cl. 156—244 **10 Claims**

A process and apparatus for producing sheet which comprises two facing sheets joined by continuous struts which are corrugated in two dimensions of the plane of the sheet, in which longitudinally extending mandrels positioned within a rectangular die are transversely oscillated with respect to and within the limits of the die.

3,616,019

PRODUCTION OF LAMINATED PLANE BUILDING COMPONENTS COMPRISNG A THERMOPLASTIC INNER LAYER AND METAL OUTER PLIES

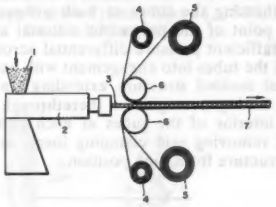
Heinz Mueller-Tamm, Ludwigshafen; Dieter Mahling, Neuleiningen; Hans Friedlingsdorf, Bad Durkeim, and Alfred Hofmann, Boxheim, all of Germany, assignors to Badische Anilin & Soda-Fabrik Aktiengesellschaft, Ludwigshafen, Germany

Filed Nov. 13, 1968, Ser. No. 775,384

Claims priority, application Germany, Nov. 16, 1967, P 17 04 505.5

Int. Cl. B29c *9/00*

U.S. Cl. 156—244 **5 Claims**



A process for the production of plane building components, comprising relatively thick inner ply of a thermoplastic and relatively thin outer plies of metal. In the process a board is prepared continuously from a polyethylene by means of an extruder at elevated temperature, the board thus obtained is continuously covered on each side first with a film of an ethylene polymer containing carboxyl groups by means of at least one pair of rollers and then with metal sheeting, the whole being made into a sandwich assembly under roller pressure and the plane building component formed being cooled to ambient temperature.

3,616,020

EXTRUSION COATING OF A HEAT FUSIBLE FOAM SHEET

Mark W. Whelan, and Arthur J. Sedani, both of Chippewa Falls, Wis., assignors to Standard Oil Company, Chicago, Ill.

Filed Jan. 15, 1969, Ser. No. 791,394

Int. Cl. B29c *19/00*

U.S. Cl. 156—244 **20 Claims**

A process for continuously coating two sides of a heat fusible foam sheet with a resinous polymeric material, having the steps of: (1) melting the resinous polymeric material; (2) extruding the resinous polymeric material through a flat film die; (3) continuously passing the heat fusible foam sheet past the flat film die; (4) contacting the heat fusible foam sheet and the resinous polymeric material; (5) compressing the contacted heat fusible foam sheet and resinous polymeric material; (6) limiting the amount of reverse wrap of the heat

fusible foam sheet and; (7) controlling the linear tension on the heat fusible foam sheet.

3,616,021
PROCESS FOR PREPARING A DECORATIVE LAMINATE SURFACED WITH A TRANSPARENT THERMOPLASTIC FILM

Paul Nicholas Valerius, Cincinnati, Ohio, assignor to Formica Corporation, Cincinnati, Ohio

Filed Oct. 29, 1969, Ser. No. 872,356
Int. Cl. B32b *31/04, 35/00*
U.S. Cl. 156—247 **10 Claims**

A process for preparing a decorative laminate surfaced with a transparent thermoplastic film in which a thermoplastic layer is positioned above the removable release sheet so as to absorb thermal shock stress in high-pressure laminate manufacture.

3,616,022
METHOD OF MAKING HEAT EXCHANGE COMPONENTS

Michael Somerville Withers, Landenberg, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 657, 380, July 31, 1967, Pat. No. 3,435,893
Filed Aug. 6, 1968, Ser. No. 750,558
Int. Cl. B32b *31/00*
U.S. Cl. 156—250 **5 Claims**

A method of fabricating assembly components for heat exchangers comprising: forming a single layer warp of a plurality of side-by-side continuous flexible hollow tubes made of an organic polymeric composition, constraining the warp laterally at a given portion along its length so that the tubes engage in each other laterally, applying a clamping force to the tubes at such portion across the width of the warp to move the engaged portions of the tubes into further engagement with each other; while maintaining such pressure, heating the tubes at such pressure to above the softening point of the polymeric material and concurrently applying sufficient pressure differential across the tube walls to expand the tubes into engagement with each other to form an integral molded structure extending transversely across the warp having passageways therethrough communicating with the interior of the tubes at each end of the molded structure; removing said clamping force; and removing the molded structure from such position.

3,616,023
PROCESS FOR MANUFACTURING SUEDELIKE SHEET MATERIAL

Osamu Fukushima, Kurashiki; Kazuo Nagoshi, Kurashiki, and Tamon Kishida, Itami, all of Japan, assignors to Kurashiki Rayon Co., Ltd., Kurashiki, Japan

Filed Oct. 23, 1968, Ser. No. 770,076
Claims priority, application Japan, Nov. 4, 1967, 44/71,070
Int. Cl. B32b *31/18*
U.S. Cl. 156—254 **11 Claims**

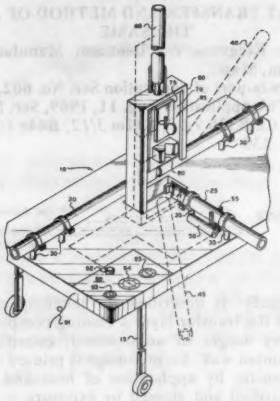
Suedelike sheet is manufactured by forming a coagulated polymer layer containing relatively large spongy spaces inside between two base materials and tearing the coagulated polymer layer into two layers at the center of the polymer layer by pulling both the base materials mutually in an opposite direction.

3,616,024
METHOD AND APPARATUS FOR WELDING HEAT SEALABLE PIPES

Tommy J. Windle, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed July 14, 1969, Ser. No. 841,428
Int. Cl. B32b *31/00*
U.S. Cl. 156—257 **9 Claims**

T- and Y-joints are formed by welding the butt end of a first pipe of heat sealable material, such as polyethylene, to a continuous second pipe of heat sealable material, such as polyethylene, by aligning the axis of both pipes in a common plane, removing a shaped section of pipe wall from the continuous pipe and removing a portion of the butt end of the first pipe so as to form the butt end into a complementary shape to that of the removed shaped section of the continuous pipe, heating, preferably simultaneously, the

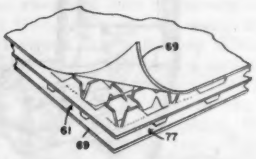


shaped sections and pressing the pipes together to form a joint that will provide for fluid communication between the pipes.

3,616,025
METHOD FOR MAKING CELLULAR STRUCTURES

Theodore H. Fairbanks, West Chester, Pa., assignor to FMC Corporation, Philadelphia, Pa.

Filed Mar. 19, 1968, Ser. No. 714,231
Int. Cl. B32b *3/10*
U.S. Cl. 156—257 **5 Claims**

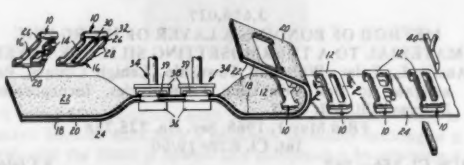


A method for making a cellular structure having a plurality of walls extending along intersecting planes and together providing abutting cells, such walls being connected at their locations of intersection by cruciform sections and formed by flexing portions of a slit web material into planes disposed at angles to the plane of the original web material.

3,616,026
METHOD OF APPLYING AN ADHESIVE MOUNTING MATERIAL

Walter C. Larsen, Edina, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 8, 1968, Ser. No. 765,831
Int. Cl. B32b *31/00;* **B44c** *1/18*
U.S. Cl. 156—261 **9 Claims**



A method of applying a mounting material having pressure-sensitive adhesive on two opposed faces to a

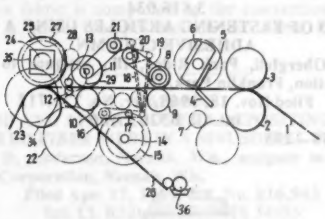
preformed emblem having a mounting surface and at least one rib which protrudes from the border of the mounting surface. The method comprises the steps of placing a preformed emblem formed with ribs on one of the pressure-sensitive adhesive-coated faces of a strip of mounting material and applying pressure to the emblem sufficient to force the ribs through the mounting material and adhere the coated face of the severed mounting material on which the ribs of the article are placed to the mounting surface of the emblem.

3,616,027

METHOD FOR APPLYING CARDBOARD REINFORCEMENTS ONTO A PAPER WEB OR THE LIKE

Karl-Heinz Honsel, Amwaldwinkel 10, Bielefeld, Germany

Filed Dec. 26, 1967, Ser. No. 693,328
Claims priority, application Germany, Dec. 23, 1966, M 72 149
Int. Cl. B32b *31/18*
U.S. Cl. 156—265 **1 Claim**



Method for gluing reinforcing strips, such as cardboard, onto a web of paper in order to form reinforced handle portions in shopping bags, where a roll of cardboard pulled in by rollers is perforated transversely of the web at predetermined desired distances from one another to form a blank unit with a plurality of blanks which are fed to a segment roller that applies the blanks in spaced relation to glue-bearing areas on a continuously moving web of paper which operates at the same velocity as the segment roller and where any desired number of blanks may be cut and transferred to the web.

3,616,028

PROCESS OF BONDING RESIN-IMPREGNATED OVERLAY MATERIAL TO A COATED SUBSTRATE MATERIAL UTILIZING HIGH-ENERGY RADIATION

Lewis S. Miller, Bellevue, Wash., and Fraidoun Shafizadeh, Missoula, Mont., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Apr. 4, 1967, Ser. No. 628,297
Int. Cl. B29c *19/02*
U.S. Cl. 156—272 **7 Claims**

A method of simultaneously bonding and curing an impregnated overlay material of, particularly wood veneer, to a substrate material by thoroughly impregnating the overlay material with a polymerizable monomer or polymer dissolved in monomer, bringing the overly into contact with the substrate material previously coated on the surface to be contacted with a bonding material, and exposing the resulting product to high-energy radiation.

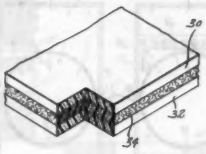
3,616,029

METHOD FOR FORMING A RESILIENT PAD FROM A PLURALITY OF PLASTIC FOAM SHEET MEMBERS

Samuel Lerman, St. Louis, Mo., assignor to Milbern Company, St. Louis, Mo.

Filed Aug. 21, 1968, Ser. No. 754,264
Int. Cl. B32b *31/06, 31/12*
U.S. Cl. 156—276 **7 Claims**

The method for forming a resilient pad from a plurality of plastic foam sheet members comprises stacking a plurality of such sheet members above one another within a press with their adjacent surfaces touching, compressing the sheet members together under an initial pressure of from 5 pounds to 20 pounds per square inch, applying heat to the sheet members until they reach a uniform temperature throughout their thicknesses of from 250°–300° F., increasing the pressure exerted by the press on the sheet members to between 30 and 100 pounds per square inch to cause the sheet members to fuse together into a pad of unitary



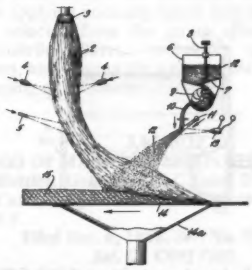
construction. A second embodiment of the invention includes sandwiching a layer of shredded foam materials between the sheet members before the application of heat and pressure. Fibrous materials selected from the group consisting of glass fibers, acrylic fibers, cotton, jute, wool, and sisal may be mixed with a catalyzed resin and sandwiched between plastic foam sheet members before the application of heat and pressure.

3,616,030

MANUFACTURE OF PLATES OR SHAPED SHEETS HAVING A BASE OF MINERAL FIBERS, PARTICULARLY GLASS FIBERS

Claude Jumentier, La Celle Saint Cloud, (Yvelines), and Alain Bonnet, Clermont (Oise), both of France, assignors to Compagnie de Saint-Gobain, Neuilly-Sur-Seine (Seine), France

Filed May 6, 1968, Ser. No. 726,706
Claims priority, application France, May 11, 1967, 106046
Int. Cl. B32b *31/06*
U.S. Cl. 156—285 **18 Claims**



The invention contemplates the homogeneous distribution of hard granules or particles throughout a mass of resin-coated mineral fibers to produce structural units in the form of sheets or slabs composed of the mass of mineral fibers in lattice-work form, particularly glass fibers, agglomerated with the dried and cured resin binder and having interspersed in the meshes of the mass, the separate hard and indeformable particles, either in solid form, such as sand, or in porous form, such as perlite or vermiculite, which render the structural units strongly resistant to physical deformation while enhancing the heat-insulating characteristics thereof.

3,616,031

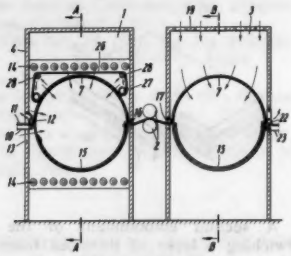
PROCESS FOR BONDING FELTS AND NEEDLED FELTS

Heinz Fleissner, Egelsbach Bei Frankfurt, Germany, assignor to Vepa AG

Continuation-in-part of application Ser. No. 642,496, May 31, 1969. This application Feb. 14, 1969, Ser. No. 799,479
Int. Cl. B65h *75/06*
U.S. Cl. 156—285 **18 Claims**

The present disclosure relates to a process and apparatus for bonding felts or feltlike materials which comprises adding

to the materials to be bonded a synthetic bonding fiber thereby forming a fiber blend and fuse-bonding the fiber blend by heat-treating said blend to the sticking or melting point of the bonding fibers and setting the fiber blend by cooling down the bonded fibers, said heat-treatment and



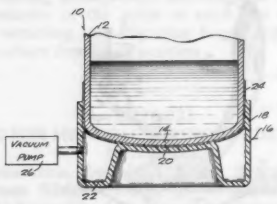
cooling down stages being effected shocklike by passing at least part of the heating and cooling treatment medium through the material being treated. The present disclosure is particularly directed to the use of steam during the treatment process as well as to the application of pressure to the fiber blend while said blend is in a heated state.

3,616,032

METHOD OF ATTACHING POLYVINYL BASE TO PRESSURE VESSEL

Willert O. Kugler, Milwaukee, Wis., assignor to Pressed Steel Tank Co., Inc., Milwaukee, Wis.

Filed June 28, 1968, Ser. No. 740,877
Int. Cl. C09j *3/00*
U.S. Cl. 156—286 **9 Claims**



A primer is applied to the exterior surface of the bottom of a metal vessel. The vessel and primer are heated above the plastic temperature of a base made of polyvinyl chloride and, while above that temperature, are pressed into engagement with the polyvinyl chloride base. The primer preferably is partially thermosetting and partially thermoplastic. After a sufficient amount of time to achieve surface fusion between the primer and the base, but before heat can permeate the base too deeply, cooling water is poured into the vessel to rapidly cool the vessel bottom and the fusion interface.

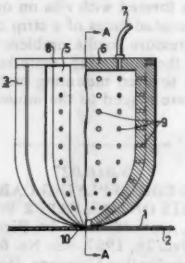
3,616,033

METHOD OF PRODUCING A PACKAGING CONTAINER COMPRISING A CONTAINER BODY OF THERMOPLASTIC MATERIAL

Anders Ruben Rausing, Blentarp, Sweden, assignor to Sobrefina SA, Fribourg, Switzerland

Filed Sept. 9, 1968, Ser. No. 758,433
Claims priority, application Sweden, Sept. 25, 1967, 13129/67
Int. Cl. B29c *17/06*
U.S. Cl. 156—287 **1 Claim**

A thermoplastic container is provided with a lining of metal foil coated with thermoplastic material which is folded or pleated to fit the container snugly and is heat sealed thereto. Suitable covers or lids are provided so that the final



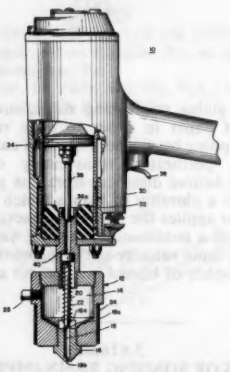
container is most suitable as to cost, weight, impermeability and finally as to customer appeal.

3,616,034

METHOD OF FASTENING ARTICLES USING A LIQUID ADHESIVE COLUMN

Allen R. Obergfell, Park Ridge, Ill., assignor to Fastener Corporation, Franklin Park, Ill.

Filed Nov. 18, 1968, Ser. No. 776,712
Int. Cl. B32b *31/00*
U.S. Cl. 156—295 **16 Claims**



An improved fastening device is provided for driving adhesive through a solid workpiece to the interface thereof with a base member. The fastening device includes a chamber for adhesive, with a nozzle communicating from the chamber. Means are provided for propelling adhesive from the nozzle at high speed to drive the adhesive through a workpiece. The adhesive will spread between the interfaces of the workpiece and base member.

An improved method of fastening a solid workpiece to a base member is also provided. The improved method comprises driving a liquid adhesive through the workpiece with sufficient force and velocity to penetrate to the workpiece, and provide spreading of the adhesive at the interface of the workpiece and base member.

3,616,035

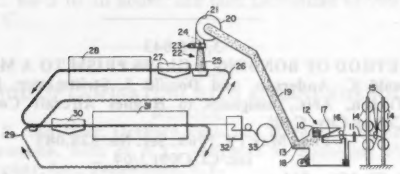
METHOD OF CONTINUOUSLY MAKING A UNIFORM NONWOVEN FABRIC

Ralph J. Baskerville, Jr., Springfield Township, Hamilton; Mario S. Marsan, Springfield Township, Hamilton, and Joseph S. Baker, Green Township, Hamilton, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Dec. 26, 1968, Ser. No. 787,018
Int. Cl. B32b *17/04*
U.S. Cl. 156—296 **6 Claims**

A method of making nonwoven fabrics from one or more strands of rayon tow wherein at least one strand is

continuously fed to a cutter which severs the strand into short bundles, preferably from about 0.2 to about 0.4 inch in length. The bundles of fibers are partially separated and dispersed as they are moved to an enclosed chamber by a blower. An air knife directs air jets transversely to the



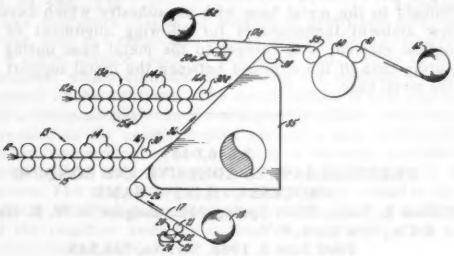
direction of fiber flow in the enclosed chamber in order to completely separate the individual fibers whereupon they are uniformly deposited in random fashion on a wire. The nonwoven fabric is completed by the conventional steps of spraying a binder composition on the fibers followed by drying.

3,616,036

METHOD AND APPARATUS FOR DEPOSITING HIGHLY DRAFTED FIBER WEBS IN A SINUSOIDAL PATTERN

Richard D. Anderson, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Apr. 17, 1969, Ser. No. 816,943
Int. Cl. B32b *31/00*; **B65h** *54/06*
U.S. Cl. 156—298 **10 Claims**



An improved method and apparatus for depositing a tenuous web of highly drafted fibers in a sinusoidal pattern on the adhesively printed surface of a carrier sheet are disclosed. The apparatus includes a rotating wave roll with axially spaced peripheral grooves which laterally oscillate the drafted web in a sinusoidal pattern as the roll rotates.

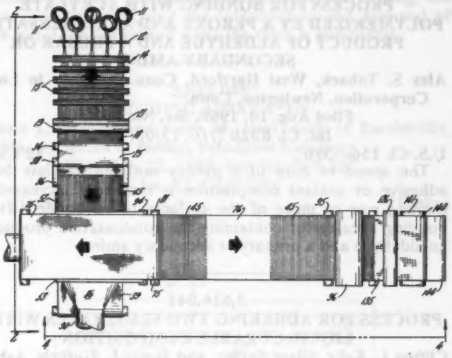
3,616,037

METHOD AND APPARATUS FOR CROSSLAYING WEB MATERIALS

William H. Burger, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Aug. 8, 1969, Ser. No. 848,657
Int. Cl. B32b *31/00, 31/08*
U.S. Cl. 156—303 **13 Claims**

A method and apparatus for efficiently handling and crosslaying webs of substantially aligned lightweight fibers in the production of nonwoven materials incorporating such crosslaid fibers for two-dimensional strength. Webs of substantially aligned fibers are conveyed along a first permeable carrier with their fibers oriented in the direction of travel and are transferred to a second moving permeable carrier crossing in closely spaced parallel relation by directing an airflow through said permeable carriers when each web length reaches the position between the crossing carriers. The airflow causes the lightweight web length to be removed from the first carrier and to be positioned and held against the other moving carrier with the web fibers oriented thereon transversely to the direction of travel. The illustrated apparatus includes two such carrier systems for changing the orientation of web lengths with respect to their direction of travel, and these systems alternately present web lengths to a



continuous moving fiber web to form an uninterrupted ply of crosslaid fibers thereon. Two adhesively coated cover sheets are then applied to contain the crosslaid fibers and form a composite nonwoven material.

3,616,038

FIBER BONDING PROCESS

John C. Moseley, Woking, and Rupert E. Schaffer, Camberly, both of England, assignors to Shell Oil Company, New York, N.Y.

Filed Dec. 8, 1969, Ser. No. 883,238
Claims priority, application Great Britain, Dec. 9, 1968, May 21, 1969, 58,286/68; 25, 848/69
Int. Cl. C09j *5/02*
U.S. Cl. 156—307 **9 Claims**

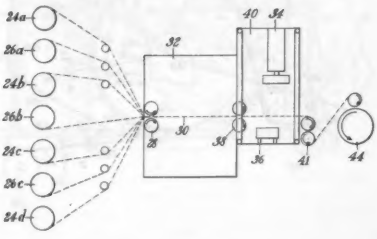
Bonded fiber fabrics are produced by a process which comprises applying normally liquid sulfolanyl ether to a web of fibers selected from the group consisting of modified polyacrylonitrile fibers, cellulose ester fibers and chlorofibers, and heating the web and the sulfolanyl either to effect bonding of the fibers.

3,616,039

METHOD OF MAKING A LAMINATED CAPACITOR

John R. Hutzler, Greenville, S.C., and David J. Valley, San Diego, Calif., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 6, 1968, Ser. No. 781,907
Int. Cl. C09j *7/00*
U.S. Cl. 156—309 **12 Claims**



A method of making a low value, high quality laminated capacitor which includes inserting at least one sheet of a solid organic dielectric film, having adhesive properties when heated, between electrically conductive metal sheets heating the organic dielectric film to a softening temperature substantially below its melting point, and pressing the organic dielectric sheet and the metal sheets together to bond the

dielectric to the metal sheets so as to form a laminate. The laminate is formed without a separate bonding agent.

3,616,040

PROCESS FOR BONDING WITH ACRYLATE POLYMERIZED BY A PEROXY AND A CONDENSATION PRODUCT OF ALDEHYDE AND A PRIMAR OR SECONDARY AMINE

Alex S. Toback, West Hartford, Conn., assignor to Loctite Corporation, Newington, Conn.

Filed Aug. 14, 1968, Ser. No. 752,506
Int. Cl. B32b *7/10, 15/08, 27/26*
U.S. Cl. 156—310 **12 Claims**

The speed of cure of a peroxy initiated acrylate based adhesive or sealant composition is markedly increased by treating one or more of the surfaces to be bonded with a bonding accelerator containing the condensation product of an aldehyde and a primary or secondary amine.

3,616,041

PROCESS FOR ADHERING TWO SUBSTRATES WITH A LIQUID CURABLE COMPOSITION

Clifton L. Kehr, Silver Spring, and James L. Guthrie, Ashton, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Jan. 23, 1969, Ser. No. 793,534
Int. Cl. B32b *27/32*
U.S. Cl. 156—310 **2 Claims**

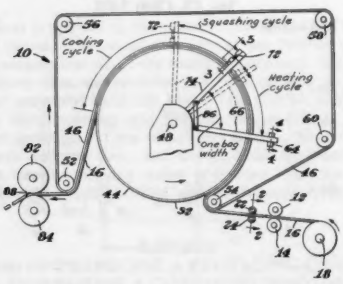
This invention relates to curing of coatings, sealants and laminates under ambient conditions without effecting the pot life of a curable liquid composition comprising a polyene containing at least two reactive unsaturated carbon to carbon bonds per molecule and a polythiol containing at least two thiol groups per molecule, the total combined functionality of (a) the reactive unsaturated carbon to carbon bonds per molecule in the polyene and (b) the thiol groups per molecule in the polythiol being greater than four which comprises having present at least a minor amount of an iron-containing material either as a portion of the substrate, as a primer coat for the substrate or as a top coat for the curable composition. In the case where oxygen is excluded from the reaction, a minor amount of an oxime ester is added to the system to assure curing to a solidified product.

3,616,042

BAG-MAKING APPARATUS AND METHOD

Carlton E. Beyer, and Raymond D. Behr, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 29, 1968, Ser. No. 733,141
Int. Cl. C09j *5/00*
U.S. Cl. 156—311 **8 Claims**



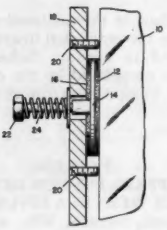
Apparatus and method for forming bags from flattened tubular or longitudinally folded web stock wherein the stock can include opposed beadlike closure members located on the inner surface thereof. The flattened stock is initially sandwiched between two layers of release material, and then directed to between cooperating sealing elements, one of which is heated. The sealing elements laterally seal the stock at regularly spaced intervals to form a plurality of connected compartments or bags. Assisting the sealing elements is a stomperlike member which flattens the closure members in the region of each seal, thereby rendering the seal at the closure substantially liquid and gastight. Thereafter, the release is removed from each side of the sealed stock, and the stock parted into individual bags.

3,616,043

METHOD OF BONDING A GLASS PRISM TO A METAL

Ronald C. Anderson, and Donald J. Strittmatter, both of Tucson, Ariz., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed May 19, 1969, Ser. No. 828,085
Int. Cl. C09j *5/04*
U.S. Cl. 156—311 **6 Claims**



The method of bonding an optical element to a base includes as a first step the bonding of the optical element to a metal support having substantially the same coefficient of expansion as the optical element. The metal support is then bonded to the metal base with an adhesive which cures at low ambient temperatures for allowing alignment of the optical element with respect to the metal base during the curing time of the adhesive between the metal support and the metal base.

3,616,044

PRECROSS-LINKED ADHESIVE AND BONDING PROCESS UTILIZING SAME

Clifton L. Kehr, Silver Spring, Md., assignor to W. R. Grace & Co., New York, N.Y.

Filed June 5, 1968, Ser. No. 734,545
Int. Cl. C09j *5/10*
U.S. Cl. 156—320 **4 Claims**

This invention relates to precross-linked adhesives having a gel content of at least 4 percent comprising prior to cross-linking a thermoplastic polymeric material in combination with a source for generating free radicals and a process for forming a bond between contiguous surfaces of metallic elements using the aforesaid precross-linked adhesive.

3,616,045

PROCESS FOR INCREASING THE STRENGTH AND ELECTRICAL CONDUCTIVITY OF GRAPHITE OR CARBON ARTICLES AND/OR FOR BONDING SUCH ARTICLES TO EACH OTHER, TO CERAMIC ARTICLES OR TO METALS

Laszlo Kozar, Tatabanya; Mihaly Toth; Jozsef Uveges, Budapest; Endre Pataki, Biscke, and Sandor Kota, Tatabanya, all of Hungary, assignors to Tatabanyai Aluminiumkoho, Tatabanya, Hungary

Filed Feb. 17, 1969, Ser. No. 799,997
Int. Cl. C23c *17/00;* **B01k** *5/00;* **C23k** *13/00*
U.S. Cl. 156—326 **7 Claims**

An impregnating composition for increasing the strength and electrical conduction of graphite and carbon articles, comprises 60–90 percent by volume furfurol or furfuryl alcohol, 5–20 percent by volume anthracene oil, and as a catalyst either 2 to 25 percent by volume phosphoric acid or 5 to 35 percent by volume of titanium ethyl ester. A bonding composition for impregnating and bonding graphite and carbon articles to each other and to ceramic articles and

metals, comprises this impregnating composition in an amount 20 to 80 percent by weight, 1 to 15 percent by weight of boric acid or boric oxide, and the rest a filler, which can be TiC, TiB_2, SiC, B_4C, BN, CaO, Al_2O_3, powdered coke, graphite or a mixture thereof. To impregnate or bond, the impregnating composition or bonding composition is applied and the articles are heated at 80 to 250° C. for 2 to 10 hours, and then carbonized at 300° to 1,500° C.

3,616,046

METHOD OF LAMINATING WITH ANILINE-PHENOLIC RESOLE

James R. Benzinger, Orchard Park, and Harold D. Marshall, Tonawanda, both of N.Y., assignors to Spaulding Fibre Company, Inc., Tonawanda, N.Y.

Filed June 10, 1968, Ser. No. 735,562
Int. Cl. C09j 3/16
U.S. Cl. 156—331 1 Claim

A laminated product possessing good physical and electrical properties made with an impregnating resin which is a reaction product of aniline, phenol and formaldehyde. These resins impart unusually good electrical and physical properties to the laminated product and are sufficiently water soluble as to allow their water content to be adjusted for direct, one stage impregnation of cellulose fiber materials such as paper.

3,616,047

BONDING PROPYLENE POLYMERS TO METAL SURFACES

Alfred W. Kehe, Berkeley, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed Sept. 8, 1969, Ser. No. 855,878
Int. Cl. C09j 3/14
U.S. Cl. 156—334 7 Claims

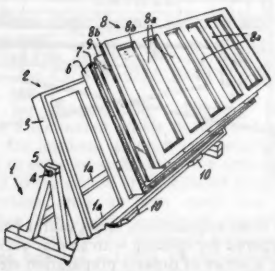
This disclosure relates to bonding a propylene polymer article, such as a removable closure member for a container, to a metal surface, such as the metal end portion of the container, which contains an opening for removal of the contents of the container. The metal surface is first coated with a thermosetting enamel coating composition. Next there is applied to the enamel coated surface a heat activatable adhesion promoting layer containing a carboxyl modified polypropylene resin having a particle size of less than 5 microns. The propylene polymer article is heat sealed to the carboxyl modified polypropylene containing coated surface and the resultant assembly is then immediately cooled to ambient temperature.

3,616,048

APPARATUS FOR ETCHING A FACE OF A LARGE SIZE GLASS PLATE PREFERABLY ACCORDING TO PREDETERMINED PATTERNS

Luigi Bresciani, Via Novembre 69, Mariano Comense, and Antonio Bresciani, Via Cadorna, Carugo Como, both of Italy

Filed Dec. 9, 1968, Ser. No. 782,041
Claims priority, application Italy, Dec. 11, 1967, 23734 A/67
Int. Cl. C23f 1/02
U.S. Cl. 156—345 6 Claims



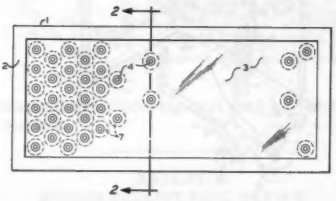
Large sheets of glass are etched on a work table that rotates about a horizontal axis. The table provides an upwardly open shallow frame for an upwardly open shallow vessel for etching acid such as hydrofluoric acid. The glass plate itself closes the acid vessel, and a retaining frame clamps the glass plate in sealed relation on the acid vessel. The parts are manipulated when the table is in a vertical position; while the introduction of the acid, the etching, the removal of the acid, and the introduction and removal of wash water are performed while the table is horizontal.

3,616,049

ETCHING APPARATUS

Vernon L. Moore, and Vado M. Hart, both of Bartlesville, Okla., assignors to Phillips Petroleum Company

Filed Oct. 22, 1969, Ser. No. 868,327
Int. Cl. C23f 1/02
U.S. Cl. 156—345 7 Claims



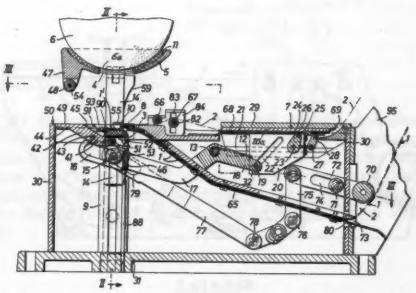
An apparatus which emits etching solution as discrete drops upon an etchable surface including a tray having a channel position circumferential to an aperture extending through the floor of said tray.

3,616,050

APPARATUS FOR ATTACHING ADHESIVE LABELS

Kurt Schrotz, Brentanostrasse 29b, Hirschhorn (Neckar), Germany

Filed Aug. 28, 1969, Ser. No. 854,362
Claims priority, application Germany, Sept. 3, 1968, P 17 86 222.5
Int. Cl. G05g 15/08
U.S. Cl. 156—358 19 Claims



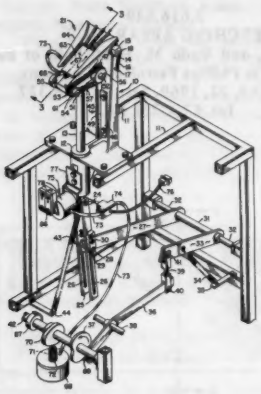
A label-attaching means has a supporting portion opposite an opening in a dished holding means for an object, such as a fruit. Transporting means successively place adhesive labels on the supporting portion, and when the holding means is displaced by the fruit or by manual pressure, the label-attaching means moves to a position in which the supporting portion thereof is located in the opening of the holding means, and presses the adhesive label against the surface portion of the object covering the opening.

3,616,051

LABEL APPLICATOR

Dennis W. Clem, Toledo, Ohio, assignor to The Reliance Electric and Engineering Company, Toledo, Ohio

Filed Jan. 27, 1969, Ser. No. 793,980
Int. Cl. B32b *31/08*
U.S. Cl. 156—363 8 Claims



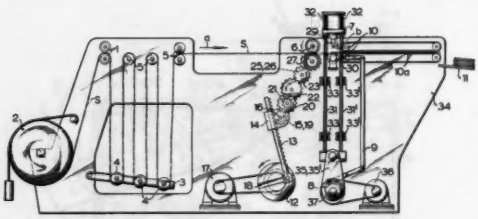
A label applicator having an operating cycle including a label-applying head, a heater carried by the head for heating the head, and current supplying and regulating circuit means for energizing the heater and for controlling the temperature of the head including variable resistance means and switch means for automatically bypassing the resistance means during a portion of the operating cycle.

3,616,052

APPARATUS FOR PROGRESSIVELY TRANSPORTING AND WELDING A WEB OF PLASTICS FOIL

August Schwarzkopf, Lengerich, Westphalia, Germany, assignor to Windmoller & Holscher, Lengerich, Westphalia, Germany

Filed Aug. 5, 1969, Ser. No. 847,547
Claims priority, application Germany, Aug. 8, 1968, P 17 79 408.0
Int. Cl. G05g *21/00;* B32b *31/20*
U.S. Cl. 156—366 5 Claims



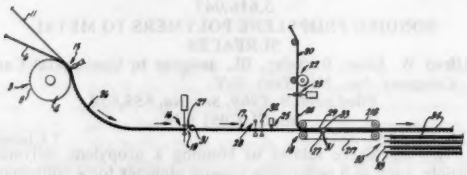
An apparatus for progressively transporting and heat sealing a web of plastic film comprising means for intermittently feeding the web to a heat-sealing tool and means for reciprocating the heat-sealing tool from an inoperative position spaced from the web to an operative position adjacent the web. The intermittent feed means comprises rotatable conveying means for the web and a first thrust crank drive which incorporates a continuously rotatable first drive shaft and a free wheel clutch. The reciprocating means comprises a second thrust crank drive operatively connected to the heat-sealing tool with the drive incorporating a second drive shaft and means to stop and rotate the second drive shaft. A first switching means is connected to the continuously rotatable first drive shaft and is adapted to act upon the stopping and rotating means to rotate the second drive shaft when the heat-sealing tool is in an inoperative position. A second switching means is connected to the second drive shaft and is adapted to act on the stopping and rotating means to stop the second drive shaft when the heat-sealing tool is in an operative position. Time switch means is provided for temporarily halting the second drive shaft when the heat-sealing tool is in an operative position and is adapted to act on the stopping and rotating means to rotate the second drive shaft again with a third switching means on the second drive shaft being adapted to act on the stopping and rotating means to stop the second drive shaft when the heat-sealing tool is in an inoperative position.

3,616,053

PAPER BACK LATH MAKING MACHINE

Wolfgang B. Fahrenbach, Oakland, Calif., assignor to Stryco Manufacturing Co., San Francisco, Calif.

Division of Ser. No. 761,242, Sept. 20, 1968, Pat. No. 3,546,771
Filed Mar. 5, 1970, Ser. No. 16,650
Int. Cl. B32b *51/20;* B23k *9/02;* B23p *19/00*
U.S. Cl. 156—380 12 Claims



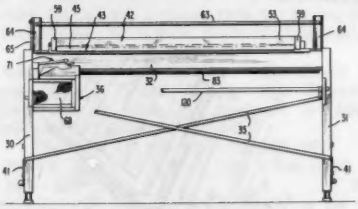
A machine for making paperbacked wire lath sheets from continuous paper strips and continuous wires, the latter being in crossing relation at opposite sides of said strip and welded together at their crossing points through slots in said strip. The paper and wires are brought together on the outer periphery of a revolvable drum that includes welding electrodes, and aligning and positioning means in cooperative relation to the slots in the paper and wires for insuring the desired positioning of the wires at their crossing points for welding together through said slots.

3,616,054

APPARATUS FOR SPLICING MULTIPLE THERMOPLASTIC YARNS UTILIZING TRACK-MOUNTED MOBILE HEAT SPLICING UNIT AND COACTING YARN GAGING AND HOLDING MEANS

Willie V. Williams, 701 S. Green St., Dalton, Ga.

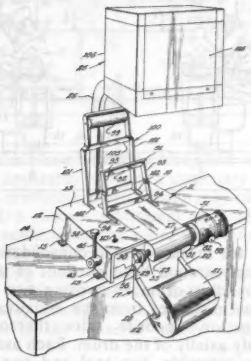
Filed Nov. 6, 1968, Ser. No. 773,773
Int. Cl. B29c *27/06;* B65h *69/08*
U.S. Cl. 156—380 12 Claims



Yarn ends from substantially spent plural beams of carpet yarns are prepared for splicing with similar yarn ends of new full beams by a series of orderly preparation steps. Following this, each set of trailing yarn ends from a previous single exhausted beam is spliced quickly by the operation of the

invention splicing apparatus with the yarn ends of a single new beam, and the identical splicing operation is repeated for a required number of new beams utilized in producing carpet of a given width.

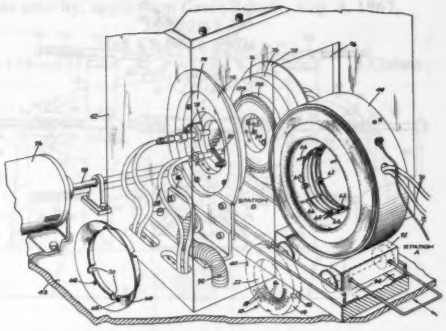
3,616,055
OPTICAL PLATE MOUNTER
David H. Mages, 1246 Swainwood Drive, Glenview, Ill.
Filed May 16, 1969, Ser. No. 825,278
Int. Cl. B41m *1/16*
U.S. Cl. 156—384 **8 Claims**



Optical plate mounter enabling the conventional flexible printing plate to be accurately aligned with the printing cylinder and mounted thereon by the use of adhesive tape having adhesive on each of its sides. Adjustable printing cylinder mounting fixtures are provided in advance of a horizontal plate mounting surface to align the peripheral surface of the printing cylinder with the plane of the plate mounting surface. A projector is disposed above the plate mounting surface and projects an optically correct grid on the plate mounting surface and printing plate and printing cylinder to insure accuracy in mounting the printing plate on the printing cylinder. The printing cylinder is indexed to enable a selected number of printing plates to be placed on the printing cylinder, and print in a predetermined sequence. A roll of adhesive tape commonly called sticky-back is mounted beneath and parallel to the printing cylinder. A parallel bar is mounted to be lowered directly onto the printing cylinder and serve as a guide for a cutting knife to accurately cut the sticky-back and attain a butt joint of the sticky-back when placed on the cylinder. A pressure roller is provided which can be lowered directly onto the printing cylinder to then press the printing plate to the sticky-back.

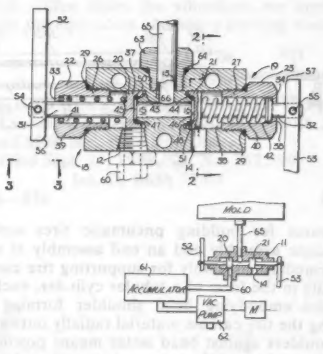
3,616,056
APPARATUS FOR COMPRESSING A LAMINATED ARTICLE AND FOR FORMING A PROTECTIVE COATING OF INSULATING MATERIAL ON AN ARTICLE
Marion W. Sims, Fort Wayne, Ind., assignor to General Electric Company
Filed Feb. 27, 1969, Ser. No. 802,934
Int. Cl. B29c *6/04;* **B44d** *1/09*
U.S. Cl. 156—380 **15 Claims**

Apparatus for magnetically clamping together the laminations of a laminated article during at least part of its manufacture, for instance as protective coating material is being applied to selected surfaces of the article. A magnetic field is applied to the article or established in such a way that laminations which tend to flare apart are magnetically clamped. When the coating material contains magnetic particles, the magnetic field is also used to magnetically draw the material to selected portions of the article to form an increased thickness of coating on those portions. A varying magnetic field may also be used prior to the application of protective coating material to inductively preheat selected surfaces of the article to the melting temperature of the material, as well as after the application of a thermosetting



coating material to inductively heat such surfaces to set or cure the coating.

3,616,057
PRESSURE-APPLYING DEVICE
Carrol C. Sachs, 9938 Cybourn Ave., Sunland, Calif.
Filed Mar. 10, 1969, Ser. No. 805,906
Int. Cl. B32b *31/20*
U.S. Cl. 156—382 **7 Claims**

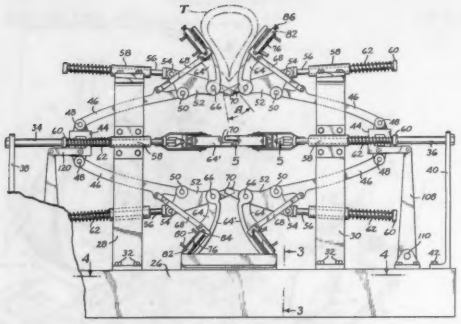


This device disclosed includes an airtight container of flexible material having a valved conduit communicating therewith. Another conduit is connected to the valve and to a source of vacuum. The valve has an inlet from ambient atmosphere. Independent control means are included in the valve for selectively interconnecting the conduits and the inlet.

3,616,058
APPARATUS FOR VENTING PNEUMATIC TIRES
John C. Fuller, 5221 S.E. Naef Road, Milwaukie, Oreg.; Gordon W. Fuller, 7320 S.W. Landeau St., Portland, Oreg.; Ralph A. Fuller, 12220 S.W. Grant, Tigard, Oreg., and William I. Fuller, P.O. Box 123, Wilsonville, Oreg.
Filed Sept. 26, 1968, Ser. No. 762,843
Int. Cl. B29h *17/24*
U.S. Cl. 156—398 **9 Claims**

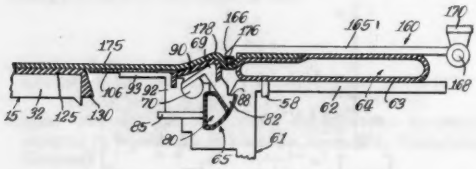
A plurality of opposed pairs of circumferentially spaced support assemblies retractably support a pneumatic tire between them with the opposed tire beads pressed together for mutual support. A power-driven piercing member on each support assembly then is driven into the tire angularly

from a point on the surface outward of the wheel rim area to a point adjacent the bead. After retraction of the piercing



members the support assemblies are retracted to release the vented tire.

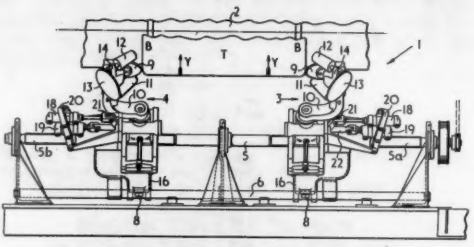
3,616,059
APPARATUS FOR ENCASING BEADS INTO A TIRE
Larry C. Frazier, Sun City, Ariz., assignor to National-Standard Company, Niles, Mich.
Filed June 12, 1968, Ser. No. 736,363
Int. Cl. B29h *17/22, 17/26*
U.S. Cl. 156—401 **15 Claims**



Apparatus for building pneumatic tires embodying an intermediate assembly and an end assembly at each end of the intermediate assembly for supporting tire carcass material initially in the form of a tubular cylinder, each of the end assemblies embodying bead shoulder forming means for displacing the tire carcass material radially outwardly to form bead shoulders against bead setter means position and hold tire beads against axial movement toward each other and in concentric outwardly spaced relation with respect to the carcass material, ply turnup means for encasing the tire beads at the bead shoulders, and in which the intermediate supporting members movable radially and circumferentially relative to each other to form the tire carcass material into substantially torus configuration upon releasing of the tire beads by the bead shoulder-forming means for axial movement of the tire beads axially toward each other.

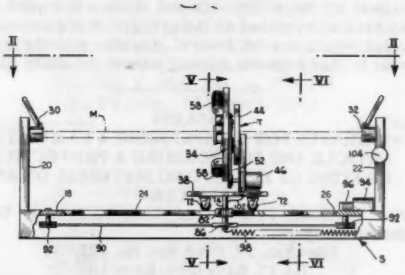
Method of building pneumatic tires in which tire carcass material is initially formed into a tubular cylinder after which radially outwardly extending tire bead shoulders are then formed inwardly of the ends of the tubular cylinder, and against which tire beads are held against axial movement toward each other arm in fixed concentric outwardly spaced relation, followed by encasing major portions of the tire beads by displacing end portions of the tire carcass material while the tire beads are held concentrically against the bead shoulders, concentrically freeing the tire beads and fully encasing the same by turning up the remaining end portions of the tire carcass material while the tire beads are engaged with the tire bead shoulders, and then predeterminately releasing the encased tire beads for axial movement toward each other in forming the tire carcass material into substantially torus configuration.

3,616,060
PLY TURNING APPARATUS
John F. Askam, Sutton Coldfield, and Charles Goodwin, Alrewas, both of England, assignors to The Dunlop Company Limited, London, England
Filed Nov. 26, 1968, Ser. No. 778,943
Claims priority, application Great Britain, Dec. 1, 1967, 54,827/67
Int. Cl. B29h *17/22*
U.S. Cl. 156—402 **15 Claims**



Apparatus for turning-up and consolidating the free ends of a carcass ply around bead portions of tire carcass being built on a building drum comprising two assemblies each disposed equal distances from the midcircumferential plain of the drum on opposite sides thereof and movable simultaneously axially of the drum. Each assembly comprises a first freely rotatable disc tool and two freely rotatable frustoconical rollers mounted one on each side of the tool and inclined towards it, the rollers supporting and manipulating the free ends during the turning-up and consolidating operation by the tool to substantially prevent distortion and ruckling of the ply. A second tool may also be provided on each assembly for consolidating an element such as a breaker cushion or fitter strip located between the bead portions of the tire carcass being built.

3,616,061
APPARATUS FOR MAKING CURVED WOUND ARTICLES
J. Warne Carter, Wichita Falls, Tex., assignor to Ciba-Geigy Corporation
Filed Feb. 5, 1970, Ser. No. 8,904
Int. Cl. B31c *1/00*
U.S. Cl. 156—431 **8 Claims**



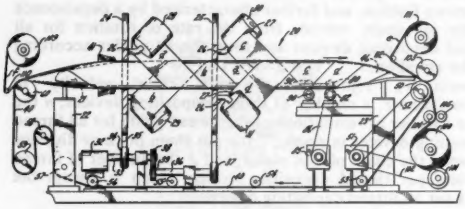
The apparatus employs a stationary supporting structure for mounting a curved mandrel, to provide a platform for a truck to ride thereon, and to provide a cam slot in the platform which corresponds to the curvature of the mandrel. The truck has a rotatable winding head on its upper side and a cam follower extending from its underside positioned in the cam slot. When movement is imparted to the truck, the cam follower traverses the cam slot and the winding head traverses the mandrel to wind material onto the mandrel.

3,616,062

BIAS-CROSSLAYING APPARATUS WITH MANDREL CONFORMING BELT

Dean K. Anderson, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Feb. 28, 1969, Ser. No. 803,175
Int. Cl. B31c 3/00
U.S. Cl. 156—432 24 Claims



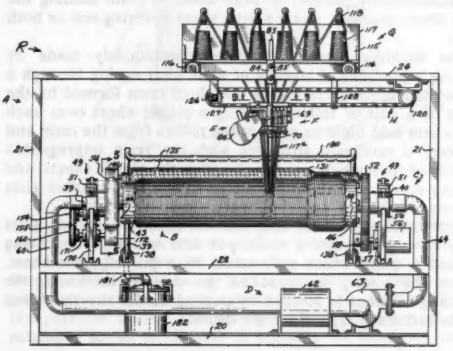
An apparatus for bias-crosslaying elongated web material is disclosed. The apparatus includes a stationary mandrel, an endless mandrel conforming belt, a plurality of planetating supply rolls and a slitter. Additional rolls for supplying longitudinally directed inner and outer webs of material are also provided. In the preferred embodiment the edges of the mandrel conforming belt include metallic elements and magnetic means within the mandrel help keep the belt in mandrel conforming configuration. Alternative means for sealing the edges of the material before slitting are also disclosed.

3,616,063

TUBULAR ARTICLES AND APPARATUS FOR FORMING THE SAME

Richard C. Bradley, c/o Plastic Engineering & Chemical Co., 3501 N.W. 9th Ave., Fort Lauderdale, Fla.

Continuation-in-part of application Ser. No. 331,549, Dec. 18, 1963, now Patent No. 3,379,591, dated Apr. 23, 1968, which is a continuation-in-part of application Ser. No. 118,912, June 22, 1961, now abandoned. This application Apr. 22, 1968, Ser. No. 723,011
Int. Cl. B31c 13/00, 1/08, 3/00
U.S. Cl. 156—425 15 Claims



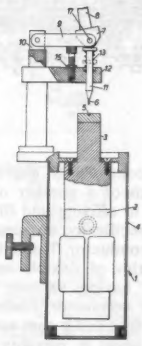
Apparatus for making pipe and the like of synthetic resins and which may include reinforcing materials comprising cut lengths of roving and filament strands by depositing the same on a mandrel of suitable size and shape, which apparatus may include mandrel drive means, heating and cooling means for the mandrel, means for depositing the material to be molded upon the mandrel, strand-tensioning means, strand carriage drive means, and means for compacting the material deposited upon the mandrel.

3,616,064

MANUFACTURE OF SYNTHETIC TEXTILE YARNS

Desmond Reginald Long, Chamberley, Surrey, and Alan Edgar Crawford, Basingstoke, both of England, assignors to Radyne Limited, Wokingham, England

Filed Apr. 25, 1968, Ser. No. 724,074
Claims priority, application Great Britain, Aug. 4, 1967, 35,873/67
Int. Cl. B65h 69/08
U.S. Cl. 156—433 3 Claims



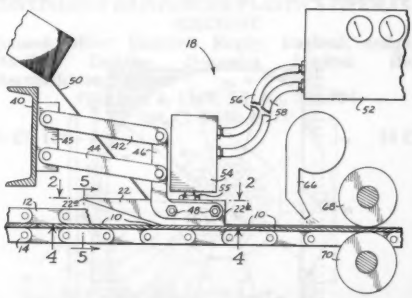
Apparatus for ultrasonically welding together two threadlines under a controlled pressure. The two ends of the threadlines are overlapped in a groove formed along an anvil and a resiliently biased plunger compresses the two ends into the groove. Vibrations transmitted through the anvil weld the two ends together. Pressure is controlled by tensioning springs which stiffen when the vibrations are applied and hence provide the equivalent of a heavy backing mass.

3,616,065

STRING AND GLUE APPLICATOR FOR VENEER

Charles L. Larson, Grants Pass, Oreg., assignor to Jeddeloh Bros. Sweed Mills Inc., Gold Hill, Oreg.

Filed Sept. 25, 1968, Ser. No. 762,590
Int. Cl. B65h 57/04
U.S. Cl. 156—436 6 Claims

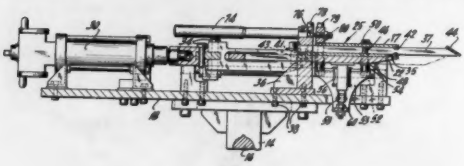


Apparatus for joining veneer strips which have been crowded into edge-to-edge abutting relationship and which are being conveyed in a direction substantially normal to their abutting edges. The apparatus includes a shoe pressed against the surface of the veneer strips for guiding uncoated string into contact with the veneer strips with the string extending across their abutting edges. Glue under pressure may be applied to the veneer prior to and after guiding the string into contact with the veneer or glue may simply be applied on top of the string. After the glue has been applied to the string the shoe presses the string, glue and veneer together to produce a bond therebetween.

3,616,066
APPARATUS FOR ADJUSTABLY POSITIONING FILAMENTS DURING THE MANUFACTURE OF FLAT MULTICONDUCTOR CABLE

Walton Rainey, Ardmore, Pa., assignor to Thomas & Betts Corporation, Princeton, N.J.

Filed June 12, 1969, Ser. No. 832,581
Int. Cl. H01b *13/06*
U.S. Cl. 156—436 9 Claims

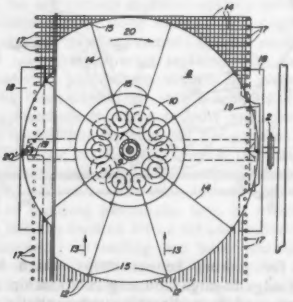


An apparatus for controllably altering, with time, the lateral spacing or pitch of a number of elongated flexible filaments, preparatory to affixing said filaments to a flexible base material. More specifically, an apparatus for adjustably positioning electrical conductor filaments, before laminating them between two strips of flexible material to form flat multiconductor cable having various lateral spacings or pitches between said conductor filaments. The machine comprises a base structure and a cam assembly which moves relative to the fixed base. A plurality of finger members terminating in filament guides, one such member and guide for each filament, are pivotally attached to the stationary part of the machine. The movable cam assembly serves to govern the positions of and degree of lateral separation between each of the filament guides. A great number of positions and degrees of spreading or separation of the guides, and consequently of the filaments, are possible without alteration or replacement of the cam means. This is accomplished by providing means for altering the velocity and end points of the stroke of the cam means.

3,616,067
PROCESS AND APPARATUS FOR FORMING CROSS MESH REINFORCED SHEETS OR FOILS

Hans Treckmann, Wuppertal-Barmen, Germany, assignor to Glanzstoff AG, Wuppertal, Germany

Filed July 11, 1967, Ser. No. 652,479
Claims priority, application Germany, July 14, 1966, V 31514, Dec. 17, 1966, G 48768
Int. Cl. D04h *3/04, 3/02, 3/12*
U.S. Cl. 156—441 20 Claims

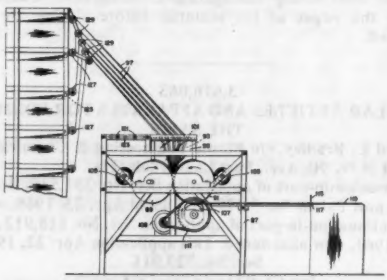


Apparatus for the manufacture of wide meshed textile layers of crossing threads or for the reinforcement of material sheets, especially plastic foils or sheets, where the textile layer is inserted between two sheets or into an unsolidified plastic sheet forming mass, characterized by rotating thread guides which are on one or several thread depositing devices, always in the same even number on each device, and which deposit yarns or threads on two pin chains which are parallel to one another in the area of the deposit and have their pins in the plane of the rotating thread guides; the cross thread groups preferably are laid down at a right angle to the direction of travel of the pin chains and continuously brought together or otherwise combined with the longitudinal thread group; and the mesh enters into or between the two material sheets, preferably foils, at least one foil having an adhesive coating whereby the mesh is bonded together with the foils or solidified therein and whereupon the cross thread group lifts off of the pins of the pin chain or is separated therefrom in known fashion, and further characterized by a dependence of the pin chain velocity from the rate of rotation for all thread depositing devices and their thread guides according to the equation: $v_K = a \times N \times T \times F$ wherein v_K represents the pin chain velocity in meters/minute, a number of thread depositing devices, n the same number of revolutions of the thread guide for all thread depositing devices in r.p.m., T the pin chain pitch or distance between the chain pins in meter, and F the number of thread carriers per thread depositing device which is always the same for all thread depositing devices.

3,616,068
APPARATUS FOR MAKING A BUILDING ELEMENT

John P. Glass, c/o Cava Industries, 79 La Grange Ave., Essington, Pa., and Anton K. Simson, San Diego, Calif.

Filed Sept. 9, 1968, Ser. No. 758,241
Int. Cl. B29d *7/00*
U.S. Cl. 156—441 9 Claims



A building element useful in constructing plastic boat hulls and methods of making the element. The building element includes a plurality of glass fibers in the form of roving which are substantially parallel to each other, a resin binding the glass fibers together, and a plastic sheet covering one or both sides.

The building element may be continuously made by passing a plurality of strands of glass fiber roving through a perforated guide plate into a trough of resin formed by the bight of a pair of rollers, feeding a plastic sheet over each roller into said bight to protect the rollers from the resin and to form a sandwich structure with the resin impregnated strands of roving being enclosed within the plastic sheets, and cutting across the plastic sheets and resin impregnated glass strands at a desired angle to form a stamp element.

The building element may also be made by passing glass fiber roving through a resin pot and winding the roving around a drum which is covered by a polyethylene sheet. When the roving has reached the desired thickness, the building element is formed by cutting across the sheet and fibers and removing it from the drum.

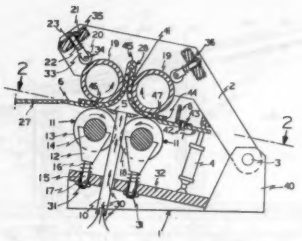
3,616,069
FOLDING DEVICE FOR TIRE BELTS

Josef Schwalbach, Roetgen by Aachen, Germany, assignor to Uniroyal Engelbert Deutschland A.G., Aachen, Germany

Filed May 21, 1969, Ser. No. 826,333
Claims priority, application Germany, May 25, 1968, P 17 78 703.0
Int. Cl. B29h *17/28*
U.S. Cl. 156—444 15 Claims

A device for folding strips of rubber-coated cord fabric so that the folded strips can be used as belt inserts in vehicle

tires. The unfolded strip is fed down an inclined table into a folding zone where it is pinched between upper and lower pairs of rollers, both motor driven. Pressurized jets of air impinge upon the underside of the fabric at spaced intervals, and force the central portion of it upwardly into a folding gap between the upper pair of rollers. The upper rollers are smooth surfaced so as to achieve more intimate contact with the tacky rubberized fabric, and therefore drag the fabric into the folding gap to complete the folding operation. The



lower rollers are grooved for less intimate contact, but temporary driving engagement with the fabric, and they can be driven at a different surface speed than the upper rollers to assist in conveying the fabric toward the entrance of the folding gap. Axially spaced bearings and rolling reinforcements for the lower and upper rollers respectively are yieldably and adjustably mounted. The upper rollers are mounted on a pivotable rack which is raised by an air cylinder to permit the insertion of the fabric, and then lowered by the cylinder to perform the folding operation.

3,616,070

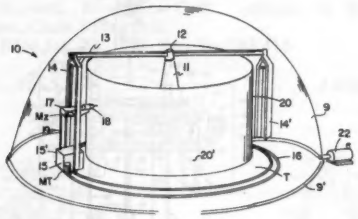
LAYUP APPARATUS

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J.

Continuation-in-part of application Ser. No. 703,287, Feb. 6, 1968, now abandoned. This application June 25, 1968, Ser. No. 739,825

Int. Cl. B65h *54/00*

U.S. Cl. 156—446 **11 Claims**



A method and apparatus are provided for forming large wall or shell-like structures such as tanks, vessels, containers and buildings on the site where they are to be used. In a first form, a filament-winding technique involves the use of a preform erected at the location of the shape to be formed, the preform and/or the filament-winding equipment being rotatable so as to dispose a plurality of filaments on the receiving surface in a circular arrangement to define strata of the wall being formed. The preform may comprise a thin sheetlike member erected at the site of use. The sheetlike wall may be self-supporting, supported by a skeletal frame or inflated and supported by air pressure.

The filament-winding apparatus may include a base for supporting the preform and the eventual housing to be formed thereof, said base being stationary such as a tarmac formed on the ground or rotatable on a tarmac to rotate the preform while the apparatus for directing material such as fluent material and/or filaments against the surface of the preform moves in a vertical direction to properly dispense same and buildup a suitable wall formation thereof. In another form, the dispensing apparatus is also operative to rotate about the preform on a track or on an overhead conveyor such as a boom or overhead track erected at the site of location of the vessel or shell.

3,616,071

APPARATUS FOR APPLYING THE ENVELOPING FABRIC TO RAW TRANSMISSION BELTS

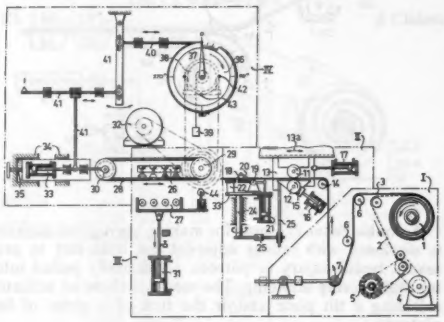
Martin Krause; Klaus Forsterling, and Walter Kase, all of Hannover, Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hannover, Germany

Filed Oct. 9, 1967, Ser. No. 673,845

Claims priority, application Germany, Oct. 11, 1966, C 40338

Int. Cl. B29h *7/22*; **B32b** *35/00*

U.S. Cl. 156—460 **7 Claims**



The present invention relates to an apparatus for applying the enveloping fabric to raw transmission belts, which apparatus is provided with spaced pulleys receiving the raw tire and with profiled rollers distributed over the cross-sectional circumference of the raw belt for folding and pressing the enveloping fabric against the raw belt. The invention is characterized primarily in that the drive of the pulleys is coupled to a control member which acts upon limit switches for releasing working operations while said control member is under the continuous load of a return force acting counter to the driving force.

3,616,072

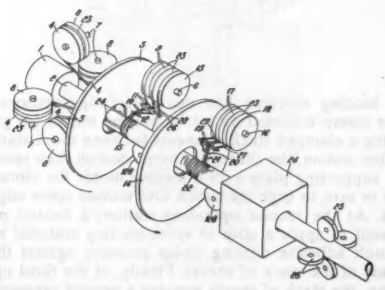
CONTINUOUS REINFORCED PLASTICS PIPEMAKING MACHINE

Raymond Oliver Bostrom, Rugby, England, assignor to Howker Siddeley Dynamics Limited, Hatfield, Hertfordshire, England

Filed Jan. 6, 1969, Ser. No. 789,194

Int. Cl. B65b *11/10*

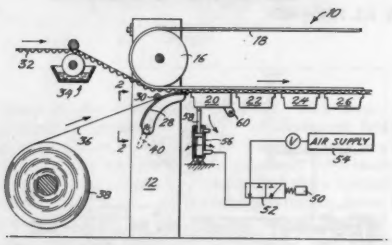
U.S. Cl. 156—468 **18 Claims**



A machine for the continuous manufacture of reinforced plastic pipe by winding rovings soaked in uncured or partially cured resin about a tubular plastic extrusion that advances

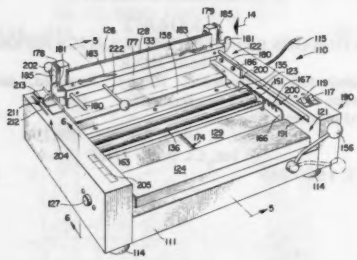
axially over a mandrel. The rovings are supplied from cakes each of which is automatically replaced when it runs out by a spare cake. Fresh cakes are also automatically supplied from a stock of cakes. Provision is also made for continuous curing and pressure testing of the pipe.

3,616,073
DOUBLE FACER WITH SAFETY MEANS
George W. McGirr, Delran, N.J., assignor to Harris-Intertype Corporation, Cleveland, Ohio
Filed Nov. 18, 1969, Ser. No. 870,474
Int. Cl. B31f *1/20*
U.S. Cl. 156—470 **9 Claims**



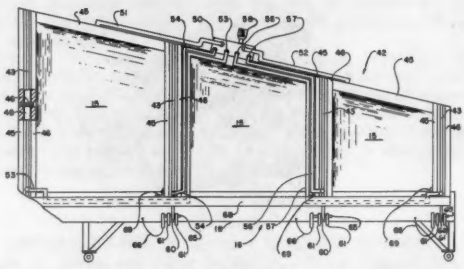
A double facer machine for making corrugated paperboard is disclosed with means adjacent the inlet end to prevent severe bodily injury to persons accidentally pulled into the machine during servicing. The means include an actuator for releasing a tilt plate and/or the first of a series of heated platens.

3,616,074
BINDING MACHINE
Wally Charles Hoff, 15 Anewen Drive, Toronto 16, and Charles Nicholas Hoff, 37 Marowyne Drive, Willowdale, Ontario, both of Canada
Filed Oct. 20, 1969, Ser. No. 867,700
Int. Cl. B42c *9/00*
U.S. Cl. 156—477 B **19 Claims**



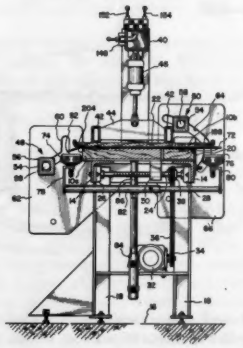
A binding machine has three operating stations and a paper clamp mounted on a transporting means for guidingly moving a clamped stack of sheets between these stations. At the first station, the sheets are supported on their spine edges on a supporting plate with a jogging motor for vibrating the plate in turn to urge the sheets into mutual spine edge alignment. At the second operating station, a heated platen is elevated to apply a strip of spine-binding material having a hot-melt adhesive coating under pressure against the spine surface of the stack of sheets. Finally, at the third operating station, the stack of sheets engages a second pressure means comprising a pair of spring-loaded rolls to press the outer marginal portions of the strip against the outermost sheets of the stack for adhesive bonding.

3,616,075
FUSELAGE JIG
Richard L. Jarvis, North Olmsted, and Walter Kully, Akron, both of Ohio, assignors to American Aviation Corporation, Cleveland, Ohio
Filed Nov. 20, 1968, Ser. No. 777,362
Int. Cl. B32b *3/04*; B29c *17/04*
U.S. Cl. 156—479 **5 Claims**



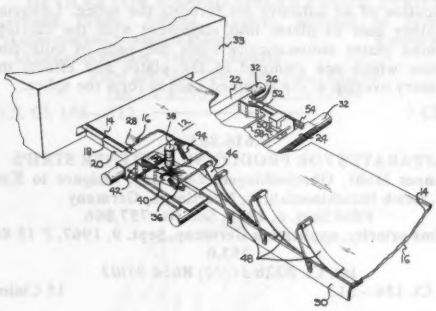
Briefly, the invention relates to jigs for placing aircraft component parts in assembled relationship and providing the pressure to bond them into a stressed skin construction.

3,616,076
FORMING APPARATUS
Johannes M. Gepkens, 5240 S. 9th East, Murray, Utah
Continuation-in-part of application Ser. No. 564,393, July 11, 1966. This application Mar. 10, 1969, Ser. No. 805,451
Int. Cl. B32b *3/04*
U.S. Cl. 156—479 **8 Claims**



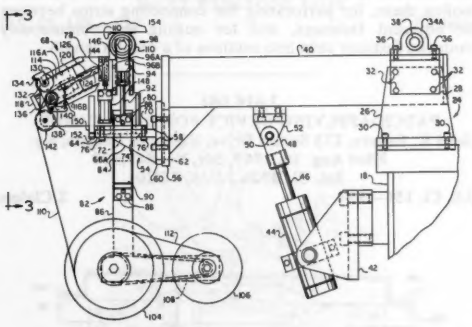
A device for fabricating laminated plastic surface objects which includes a support frame; a bed attached to the frame; a platen mounted above the bed for holding a sheet of laminated plastic material in a fixed position on the bed; an elongated die connected to the frame proximate to and along one side edge of the bed; and pressure means for bending the plastic material over the one side edge of the bed and urging said material into the die. Second pressure means can be connected to the frame for bending the opposite edge of the plastic material around a sculptured counter top blank and heaters can be connected to the frame for heating the plastic material to its softening temperature.

3,616,077
CORRUGATED PAPERBOARD EDGE SEALING AND SLITTING APPARATUS
James O. Jessee, Oaklawn, Ill., and Leonard J. Masulis, Perrysburg, Ohio, assignors to Owens-Illinois, Inc.
Filed June 20, 1969, Ser. No. 835,127
Int. Cl. B31f 1/22
U.S. Cl. 156—479 3 Claims



Apparatus for providing an improved sheet of corrugated paperboard wherein an extended edge portion of one of the liner layers is folded over the edge of the fluted medium and the other liner layer and adhesively sealed to the other liner layer while the opposite edge of the paperboard is being slit at a desired width. The apparatus is adapted to clamp to the support bars on a corrugator slitter to permit edge folding and sealing during a continuous corrugating process. This mechanism provides dimensional stability in that an edge folding plow and slitter are tied together and mounted by means of spring-loaded double hinges that apply the necessary pressure to the folding edge and permit the apparatus to follow the edge of the sheet when weave occurs.

3,616,078
APPARATUS AND METHOD FOR WRAPPING TAPE ON MULTISIDED ARTICLES
James S. Howard, Riverside, Calif., assignor to Rohr Corporation, Chula Vista, Calif.
Filed Jan. 23, 1969, Ser. No. 793,416
Int. Cl. B65c 3/12, 9/02
U.S. Cl. 156—486 3 Claims

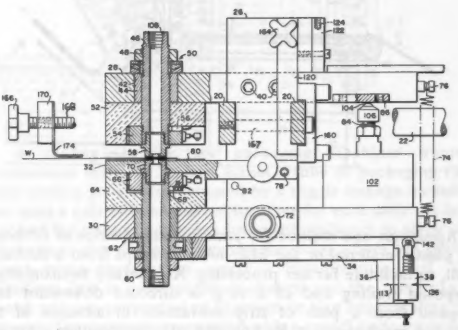


Apparatus for, and method of, wrapping tape around a multisided article, employing a yieldably supported roller and a mechanism which feeds said tape between the surfaces of the article and said roller as the latter is moved over said surfaces. After the roller has traveled diagonally across one side of the article and pressed tape thereon, the article is rotated to bring the next adjacent side into position for taping, while the roller is held against the surface of the article by the yieldable action of the means provided for supporting the roller and by the programmed movement of the roller at a predetermined rate in the direction of rotation of said article. Through repetition of the aforesaid steps, tape is wrapped around the article at a selected angle relative to its longitudinal axis.

ERRATUM

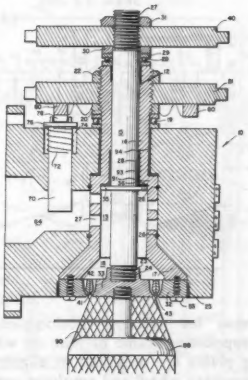
For Class 156—497 see:
Patent No. 3,615,037

3,616,079
GROMMETING MACHINE
Rubin Goldman, 22 Park Drive, Newton Highlands, Mass.
Filed May 22, 1969, Ser. No. 826,838
Int. Cl. B32b 31/26
U.S. Cl. 156—497 8 Claims



A grommeting machine with sealing tips having teeth that seal film sheets of plastic material together and simultaneously directs superheated air at the sheets to melt a hole in them.

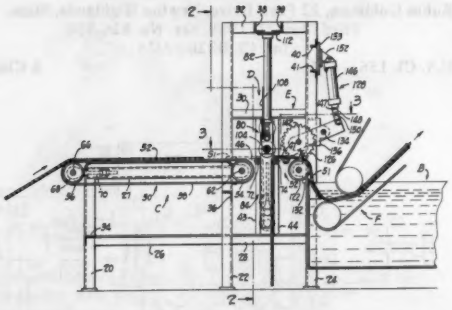
3,616,080
APPARATUS FOR EXTRUSION OF STRENGTHENED PLASTIC NETTING
George S. Nalle, Jr., 108 W. 2nd St., Austin, Tex.
Filed Dec. 27, 1963, Ser. No. 336,851
Int. Cl. B29b 5/04
U.S. Cl. 156—500 11 Claims



A method and apparatus for extruding strengthened plastic filaments of elongated cross section under increased

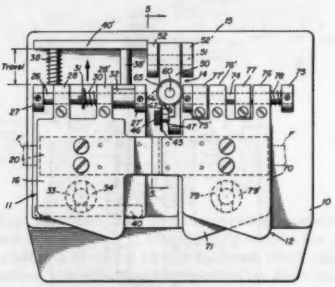
pressurization as die holes are aligned and so as to intersect the extruded strands in a substantially oxygen-free environment.

3,616,081
METHOD OF AND APPARATUS FOR HANDLING AND SPLICING STRIPS OF RUBBER, PLASTIC AND THE LIKE
Armindo Cantarutti, Akron, Ohio, assignor to Intercole Automation, Inc.
Filed Oct. 14, 1968, Ser. No. 767,166
Int. Cl. B65h *21/00*
U.S. Cl. 156—502 **6 Claims**



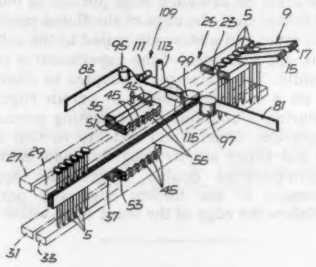
Apparatus and method for joining ends of strips of rubber or plastic material or the like, such as, strips from a rubber mill, to facilitate further processing. A generally horizontally disposed trailing end of a strip is directed downward to depend from a path of strip movement in advance of a splicing mechanism, a leading end of a succeeding strip is advanced relative to the preceding strip, and subsequent concurrent and equal advance of both strips automatically overlaps the ends for splicing.

3,616,082
FILM SPLICER
Robert F. Menary, Northbrook, Ill., assignor to Paulmar, Inc., Northfield, Ill.
Filed May 3, 1968, Ser. No. 726,426
Int. Cl. G03d *15/04*
U.S. Cl. 156—509 **14 Claims**



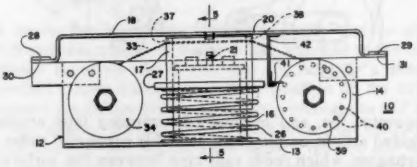
An apparatus for splicing motion-picture film which comprises a supporting frame or base on which two pairs of film-clamping plates are mounted in alignment on opposite sides of a filmcutting wheel and emulsion-scraping roller with the top plate of one pair and both plates of the other pair thereof being mounted for pivotal movement on axially aligned shafts so as to enable the plates of each pair thereof to be opened for clamping the end section of a film between the same and with the one pair of plates adapted to be swung, while clamping a film section, in an upward path so as to avoid interference with movement of the other pair of plates which are mounted on a laterally movable carriage, said carriage being adapted to be reciprocated so as to pass the end of a film clamped between the plates beneath the cutting wheel and emulsion scraper to cut off the projecting end portion of the film and scrape off the emulsion in the margin thereof thereby providing a clean area for the application of an adhesive for forming the splice. Lowering the other pair of plates into alignment with the carriage mounted plates automatically trims the ends of both film sections which are clamped in the plates and effects the necessary overlap of the trimmed ends to form the splice.

3,616,083
APPARATUS FOR PRODUCING FASTENER STRIPS
Johannes Mohr, Oberboihingen, Germany, assignor to Karl M. Reich Maschinenfabrik, Nuertingen, Germany
Filed Sept. 6, 1968, Ser. No. 757,866
Claims priority, application Germany, Sept. 9, 1967, P 15 86 253.0
Int. Cl. B32b *31/10;* **B65d** *83/02*
U.S. Cl. 156—513 **15 Claims**



A machine for mass-producing fastener strips and especially nail strips for mailing machines fully automatically and continuously. The machine consists of a combination of different means for aligning the fasteners to form a continuous row, for conveying them in a step-by-step movement at a fixed distance from each other, for heating them, for connecting them to each other by means of thin connecting strips which are coated with a thermoplastic adhesive, for pressing the connecting strips and the intermediate row of fasteners together and for thereafter cooling them, for perforating the connecting strips between the adjacent fasteners, and for cutting the continuously produced fastener strip into sections of a certain length.

3,616,084
PATCH-APPLYING DEVICE FOR DATA CARDS
Lloyd K. Rogers, 273 Sunset Drive, Highland Heights, Ky.
Filed Aug. 14, 1969, Ser. No. 849,990
Int. Cl. B32b *31/18, 31/20*
U.S. Cl. 156—514 **2 Claims**



A device for patching a data card to cover and close a perforation therein. A plate is mounted for movement toward and away from a base on which a male die is supported. An

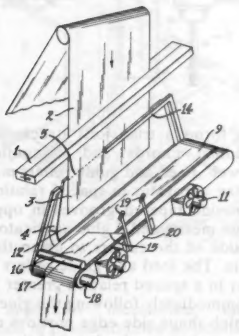
opening in the plate overlies the male die. A hollow cutter die surrounding the opening cuts a patch from a strip of tape which is directed between the dies when the plate is advanced toward the male die with a card thereon having a perforation aligned with the opening and the patch is attached to the card overlying the perforation.

3,616,085

DEVICES FOR JOINING SINGLE FABRIC STRIPS

Gerhard Printz, Vienna, Austria, assignor to Semperit Osterreichisch-Amerikanische Gummwerke Aktiengesellschaft, Vienna, Austria

Filed Jan. 30, 1969, Ser. No. 795,216
Int. Cl. B29h *17/02*; B32b *31/04*
U.S. Cl. 156—517 7 Claims



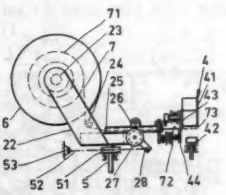
Apparatus for joining diagonally cut flanks of rubberized fabric with a small overlap including a pivotable suction device provided for lifting flanks, a conveyor belt upon which flanks are deposited and a roller pair near one end of the conveyor belt to press cut overlapping flanks together.

3,616,086

APPARATUS FOR MARKING TEXTILE ARTICLE

Nicolaas Nooder, Batavierenweg 120, Nijmegen, Netherlands

Filed Sept. 10, 1968, Ser. No. 758,719
Claims priority, application Netherlands, Sept. 13, 1967, 67/25/3
Int. Cl. B32b *31/20*, *31/10*
U.S. Cl. 156—518 8 Claims



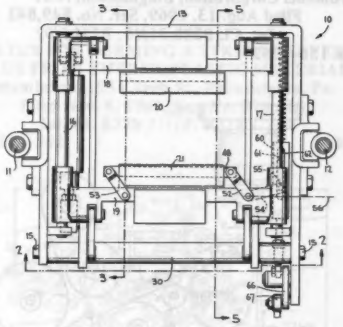
An apparatus for marking textile articles having a carrier movable between two limiting positions, a roll of label tape and feeding means on the carrier, a stamping device operatively associated with the end of the tape while the carrier is in one of the two limiting positions, and a cutter for the tape and means for applying the marked and cutoff piece of tape to the article while the carrier is in the other of the two limiting positions.

3,616,087

SEALING CARRIAGE

Nelson R. Henry, and Donald R. Middour, both of Decatur, Ga., assignors to The Woodman Company, Inc., Decatur, Ga.

Filed Oct. 6, 1969, Ser. No. 863,834
Int. Cl. B32b *31/20*
U.S. Cl. 156—518 13 Claims



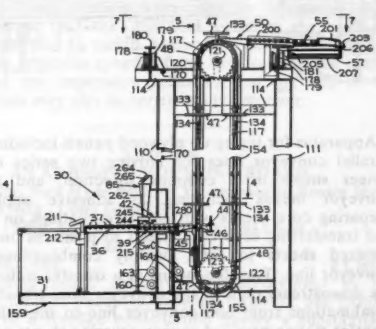
A sealing carriage for packaging machines wherein transverse seals are formed across a tube of packaging film; the sealing jaws being actuated by a toggle linkage including at least a pair of links jointed together for each slide. At least one of the links of a pair has sufficient resiliency to allow said linkage to travel slightly beyond the point where the sealing jaws come together to assure a high-pressure seal. The resilient link is substantially U-shaped and the two links of each pair are proportioned in length to give equal sealing jaw travel. The carriage is provided with a cutoff knife having an actuator bar with a closed slot in the direction of travel of the slide. Operation of the knife is effected by movement of the end of the actuator bar against an operating lever, and a tension spring supports the operating end of the actuator bar for floating action.

3,616,088

WAREHOUSE CARRIER WITH LABEL MEANS THEREON

Stanley M. Weir, Palo Alto, Calif., assignor to FMC Corporation, San Jose, Calif.

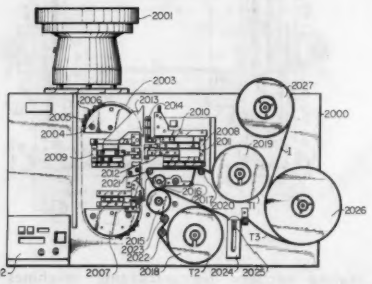
Division of Ser. No. 765,116, Oct. 4, 1968, Pat. No. 3,536,207
Filed Aug. 27, 1970, Ser. No. 67,437
Int. Cl. B44c *31/00*
U.S. Cl. 156—542 7 Claims



A warehouse comprises a carrier having means for supporting an order-picking operator, a plurality of labels,

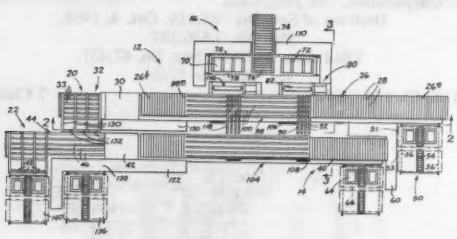
said labels containing indicia for at least indicating the location of the articles in the warehouse and the destination of the articles picked, and means on said carrier for placing each label on the picked article.

3,616,089
PREPPER-TAPER MACHINE FOR ELECTRICAL COMPONENTS
Albert W. Zemek, Binghamton, N.Y., assignor to Universal Instruments Corporation, Binghamton, N.Y.
Filed Aug. 13, 1969, Ser. No. 849,842
Int. Cl. B32b *31/10*; B21f *1/02*
U.S. Cl. 156—552 **15 Claims**



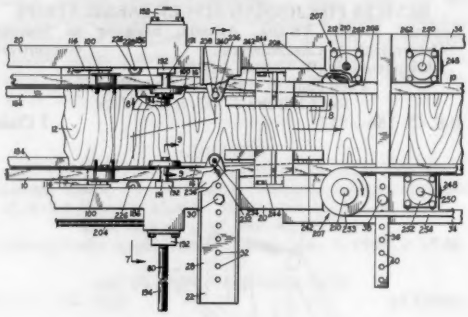
A machine for receiving unprocessed electrical components from a feed mechanism, straightening the leads, forming the leads of the components by bending them in opposite directions within the same plane, feeding the components with their formed leads onto the adhesive side of two tapes mounted on taping wheels, the oppositely bent leads contacting separate taping wheels, applying second covering tapes to seal the leads between the adhesive surfaces of the tapes and winding the taped components onto a drum.

3,616,090
APPARATUS FOR LAYING UP PLYWOOD PANELS
Charles L. Larson, Grants Pass, Oreg., assignor to Jeddeloh Bros. Sweed Mills, Inc., Gold Hill, Oreg.
Filed Mar. 4, 1968, Ser. No. 710,346
Int. Cl. B32b *31/04*
U.S. Cl. 156—559 **6 Claims**



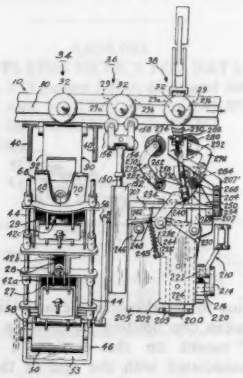
Apparatus for laying up plywood panels including a pair of parallel conveyor lines for moving two series of presized veneer sheets in a common direction, and core sheet conveyor means including an adhesive applicator for preparing core sheets with adhesive coatings on both faces and transferring such core sheets to positions on top of the presized sheets to form two-ply combinations on each conveyor line. Transfer means at a transfer station adjacent the downstream ends of the conveyor lines transfers two-ply combinations from one conveyor line to the other. At this transfer station presized veneer covering sheets are laid over the two-ply combinations, interspersed with transferred two-ply combinations to form three-ply, five-ply, etc., plywood panels, as desired.

3,616,091
FORMING APPARATUS FOR 1-BEAM-TYPE TRUSS JOISTS
Arthur L. Troutner, Skyline Drive, Boise, Idaho
Filed July 31, 1969, Ser. No. 846,530
Int. Cl. B27d *1/10*; B32b *31/10*
U.S. Cl. 156—560 **7 Claims**



The apparatus forms a truss joist structure comprising a pair of longitudinal chords and a continuous length, interconnecting web. Feed and guide rollers move the pair of chords through the apparatus in spaced relation and employ cutters which provide tapered grooves in opposed faces of the chords. Air jet means and a glue applicator are mounted on the outfeed side of the cutters to clean the grooves and apply glue therein. The feed and guide rollers for the chords support the latter in a spaced relation greater than the width of the web, and immediately following the glue applicator are crimp wheels which shape side edge portions of the web and feed such web toward the outfeed end of the apparatus. The guide rollers on the discharge side of the crimp wheels move the two chords closer together to cause engagement of the shaped edges of the web with the grooves in the chords. The apparatus has lateral adjustment means for assembling joists of different widths and also has adjustable guide rollers on its outfeed end to vary the chamber of the formed joists.

3,616,092
NECK WRAP APPARATUS
Michael Albert Lavigne, 400 Mount Pleasant, Apt. 4, Montreal, Quebec, Canada
Continuation-in-part of application Ser. No. 519,654, Jan. 10, 1966, now abandoned. This application Oct. 22, 1969, Ser. No. 871,411
Int. Cl. B65c *9/36*, *3/18*
U.S. Cl. 156—566 **5 Claims**



A label-applying machine which comprises three stations, the first station including an articulated label applicator having three individual pads for applying three different

labels, and particularly a separate pad for applying a label to the neck portion of a bottle. The next station includes a former which initiates the wrapping of the neck label about the neck of a bottle and the third station includes a sliding carriage on which are mounted articulated arms which are adapted to sequentially wrap the label about the neck of the bottle

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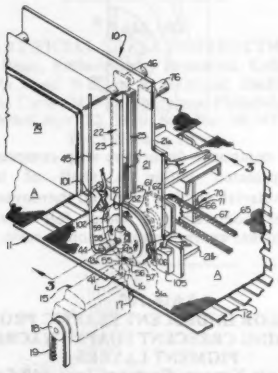
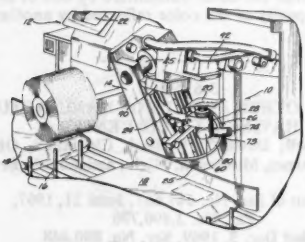
3,616,093
LABEL APPLICATOR MECHANISM
Richard K. Teed, Greenwood, S.C., assignor to Riegel Textile Corporation, Ware Schools, S.C.
Filed Aug. 29, 1969, Ser. No. 854,179
Int. Cl. B65c 9/14; B65h 3/08
U.S. Cl. 156—571 7 Claims



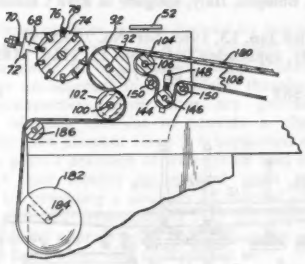
A label applicator mechanism, characterized by positioning labels in predetermined positions on spaced-apart successive articles being advanced along a predetermined longitudinal path of travel, comprising a magazine of labels mounted for reciprocating linear movement, a rotating transfer arm having alternatively actuatable suction means on the outer end thereof for transferring the labels from the magazine to the advancing articles, a sensing means for sensing an article and causing the magazine to move toward the transfer arm whereupon the suction means is actuated to receive a label therefrom and initiating rotation of the transfer arm. After the transfer arm has rotated to place the outer end thereof adjacent to the advancing articles, the suction means is deactuated to release the label and rotation of the transfer arm is stopped when the outer end thereof is adjacent to and in alignment with the magazine.

3,616,094
LABEL-TURNING DEVICE
James P. Navin, Racine, and Chester D. Matteucci, Sturtevant, both of Wis., assignors to Sturtevant Industries, Inc., Sturtevant, Wis.
Filed Nov. 28, 1969, Ser. No. 880,590
Int. Cl. B65c 1/02, 9/14, 9/28
U.S. Cl. 156—571 9 Claims



A label pickup assembly for removing labels from a label-printing machine and affixing the label on a prewrapped package at a different angular relation to the package than when picked up from the label-printing machine, the assembly including a vacuum pickup tube rotatable through 180° to pick up a label from the printing machine and move the label to a transfer position, a vacuum nozzle rotatably supported on the pickup tube and having a cam follower positioned to engage a downwardly inclined cam on the downward motion of the pickup tube to the transfer position to rotate the label through a predetermined angle and a label pickup pad to remove the label from the vacuum nozzle at the transfer position and affix the label to the prewrapped package.

3,616,095
APPARATUS FOR FORMING A STRIP OF SEVERABLE BAGS FROM THERMOPLASTIC MATERIAL
Hercules Membrino, 1934 Arch St., Philadelphia, Pa.
Filed Nov. 6, 1969, Ser. No. 874,523
Int. Cl. B32b 31/18; B31b 1/14
U.S. Cl. 156—582 9 Claims

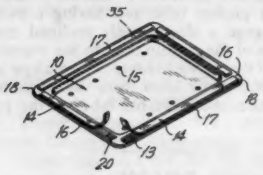


A bagmaking machine comprising a support structure upon which is mounted a rotatable heat sealing and cutting means in tangency with a rotatable impression roller, the heat sealing and cutting means being adapted to form lines of seal and severance with spaced interruptions in a double-ply thermoplastic strip as the strip moves between the heat sealing and cutting means and the impression roller from a supply roller or the like. The interruptions or "nips" form connecting means between the bags formed from the strip by the heat sealing and cutting means. These interruptions or "nips" comprise sealed portions but not severance. This type of sealing is obtained by indenting the thermoplastic material of the strip just sufficiently away from the heating means so that the heat will cause melting and sealing of the thermoplastic material, but such melting will not penetrate through the outermost layer, a sufficient distance to cause severance. The heat sealing and cutting means comprise a rotatable head having a plurality of heating wires or the like which are spaced from each other around the periphery of the head. These heating wires may be selectively made inoperative so that the distances between the operative heating wires may be varied. Means are also provided to vary the relative rotatable speeds of the heat sealing and cutting means and the impression roller so that the size of the resulting bags may also be varied in such manner.

3,616,096
AN ADHESIVE MOUNTING BOARD
Allen Roeder, New Hyde Park, N.Y., assignor to Roxter Metal Products Mfg., Long Island, N.Y.
Filed Apr. 14, 1969, Ser. No. 815,929
Int. Cl. B32b
U.S. Cl. 156—584 2 Claims

A mounting board apparatus for securement to the working surfaces of buildings, vehicles, furniture, and fixtures consisting of a traylike construction having a substantially rigid mounting surface elevated slightly above its flanged surface. The exposed face of the flange surface includes an adhesive which is covered by a backing strip so that the

surfaces can be prepared for adherence to any working surfaces. The mounting surface will accommodate electrical



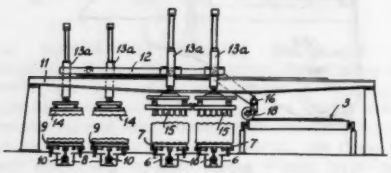
switch gear equipment which can be secured against the board and held in place in a variety of different locations.

3,616,097

APPARATUS FOR THE MANUFACTURE OF SHEETS OF ASBESTOS CEMENT OR THE LIKE, AT A HIGH HOURLY PRODUCTION RATE

Dante Colliva, Bologna, Italy, assignor to Riva Calzoni S.p.A., Milan, Italy

Filed Jan. 13, 1969, Ser. No. 790,549
Claims priority, application Italy, Jan. 22, 1968, 11855 A/68
Int. Cl. B31f *1/00*
U.S. Cl. 156—585 **6 Claims**



Apparatus for the manufacture of sheets of asbestos cement, in which a large asbestos sheet is cut, in a first station, into standard size sheets, while the large sheet is conveyed by conveyor belts towards the first station. At one side of the first station four tracks for trollies are arranged parallel to the direction of advancement of the large asbestos sheet, two of the trollies carry patterns and the other trollies, nearer to the first station carry mixed packs of patterns and asbestos cement sheets. A bridge structure extends above the first station and the tracks in a direction transverse to the tracks. A truck is movable along the bridge structure. The truck carries suction units and boxes which take up and deposit, in preestablished intervals, the patterns and the asbestos cement sheet on the trollies.

3,616,098

METHOD OF PRODUCING GLARE-REDUCING GLASS SURFACE

Joseph W. Falls, Chicago, Ill., assignor to Dearborn Glass Company

Filed Mar. 18, 1968, Ser. No. 713,992
Int. Cl. C03c *25/06*
U.S. Cl. 161—1 **12 Claims**

An improved glare-reducing glass surface is produced by including an undissolved inorganic salt of small crystal size, e.g., in the range of 10–50 microns in diameter and 2–10 micron in height, in the etching bath of an etching process. The etching process involves cleaning the glass surface, etching in a hydrofluoric acid bath or similar acid bath containing the undissolved salt by virtue of a saturated condition of the bath. Saturation of the bath is usually accomplished by ammonium bifluoride or other salt. After etching, the surface is properly polished and cleaned. The preferred, inorganic salt crystals are crystals of potassium bifluoride, sodium bifluoride, and calcium phosphate.

3,616,099

COMPOSITE STRIP OF METALLIC FOIL CORE ENCASED WITHIN IONOMER RESIN AND HAVING A CLEAR FACING STRIP

Victor Shanok, and Jesse P. Shanok, both of Brooklyn, N.Y., assignors to Glass Laboratories Company

Filed Sept. 19, 1968, Ser. No. 760,919
Int. Cl. B32b *15/08*; **B44f** *9/02*
U.S. Cl. 161—5 **5 Claims**

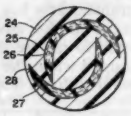
An improved composite decorative strip comprising a core member encapsulated within a shell of transparent thermoplastic material which is extruded thereover, said core member further comprising a metal foil member, said thermoplastic further comprising an ionomer resin.

3,616,100

MULTICOLOR IRIDESCENT PLASTIC PRODUCT CONTAINING CRESCENT SHAPED NACREOUS PIGMENT LAYERS

Yoshio Morita, c/o Koppers Company Inc., 440 College Park Drive, Monroeville, Pa.

Continuation-in-part of application Ser. No. 752,315, Aug. 13, 1968. This application Dec. 9, 1968, Ser. No. 782,406
Claims priority, application Japan, Dec. 29, 1967, 42/84378
Int. Cl. B44f *1/04, 1/14*
U.S. Cl. 161—5 **3 Claims**



A light-transmitting plastic resin sheet capable of exhibiting intense multicolor effects is provided. The sheet has positioned therein individual layers of at least two optically colored nacreous pigments of different optical color. The pigment crystals within an individual layer are oriented in parallel spaced relationship with respect to each other. The individual layers are positioned at an angle to each other so that the color transmitted by one of the layers intensifies the purity of the color reflected by another of the layers.

3,616,101

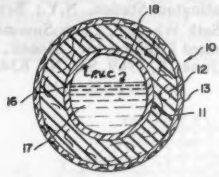
BALL OR OTHER ARTICLE OF MANUFACTURE HAVING A LIQUID CENTER

Fred E. Satchell; David T. Retford, Cincinnati, Ohio, and Robert S. Barnes, Muskegon, Mich., assignors to Brunswick Corporation

Division of Ser. No. 647,667, June 21, 1967, Pat. No. 3,490,770
Filed Dec. 5, 1969, Ser. No. 880,448
Int. Cl. A63b *37/08*
U.S. Cl. 161—7 **16 Claims**

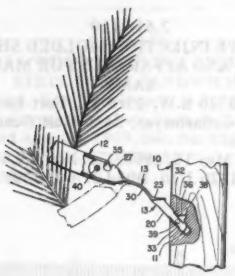
A liquid center for an article and a method for making the same from a liquid reactive mass such as a polyvinyl chloride

plastisol by forming the plastisol to spherical shape, e.g., in a



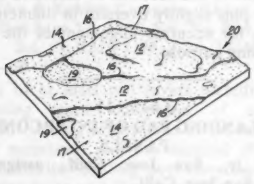
mold, and then reacting the outer portion of the mass to form a solidified skin while leaving the inner portion liquid.

3,616,102
ARTIFICIAL TREE CONSTRUCTION
Ammon A. Baus, Philadelphia; Frederick Keller, Cornwells Heights, Pa., and William B. Reukauf, Haddonfield, N.J., assignors to Carey-McFall Company, Philadelphia, Pa.
Filed Apr. 22, 1970, Ser. No. 30,747
Int. Cl. A47g *33/06*
U.S. Cl. 161—14 **6 Claims**



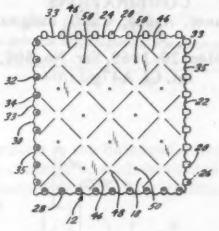
An artificial tree wherein a trunk is provided with holes and branches are provided with connectors for insertion in the holes, the connectors being automatically resistant to withdrawal from the holes. Additional features include pivotal mounting of the branches for collapsibility of the tree in its assembled condition, and flexural deformability of the connectors for adjusting the display positions of the branches.

3,616,103
TEXTURED CEMENTITIOUS SHEET
Norman Shirk Greiner, Somerville, and James Vincent Magee, South Orange, both of N.J., assignors to Johns-Manville Corporation, New York, N.Y.
Filed May 5, 1969, Ser. No. 821,810
Int. Cl. B32b *3/00*
U.S. Cl. 161—19 **4 Claims**



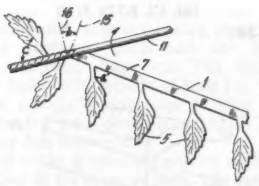
The textured surface of an asbestos-cement sheet covered with steam cure bloom or normal cure bloom is abraded in a particular manner to remove bloom from certain areas of the surface to produce a highly attractive simulated stone decorative sheet.

3,616,104
ARTIFICIAL LAWN ELEMENT
Paul L. Kuzmick, 30 Oval Road, Essex Fells, N.J.
Filed Mar. 20, 1968, Ser. No. 714,559
Int. Cl. A41g *1/00*
U.S. Cl. 161—21 **5 Claims**



An artificial outdoor lawn is formed by interconnecting a plurality of lawn elements, each lawn element including a pin which is adapted to be received within a mating opening provided in an adjacent lawn element, thereby to produce said interconnection. Projections are provided on the underside of each element to provide a clearance area beneath the lawn element when it is supported on a surface, thereby to permit drainage of water from said element. The appearance and density of natural grass is effectively simulated by providing a plurality of tufts of artificial grass blades in different arrangements over the upper portion of the lawn and by appropriately configuring the upper surface of the base from which said tufts extend.

3,616,105
ARTIFICIAL TREE BRANCH OF FOLIAGE STAMPED FROM A RIBBON OF PLASTIC MATERIAL
Theodore Marks, Hartsdale, N.Y., assignor to American Technical Industries, Inc., Mount Vernon, N.Y.
Filed Apr. 24, 1969, Ser. No. 818,992
Int. Cl. A41g *1/00*
U.S. Cl. 161—22 **1 Claim**



The invention is an artificial tree branch made of foliage which is cut or stamped from a broad ribbon of sheet plastic material. The leaves of the branch extend from a supporting strip of the plastic which is supported by a stem, such as a wire, to which the leaf supporting strip is attached.

3,616,106
LAMINATE MADE WITH RESIN AND WAX ADHESIVE MIXTURE
Hallard C. Moyer, Homewood, Ill., assignor to Sinclair Oil Corporation, New York, N.Y.
Filed Oct. 1, 1968, Ser. No. 764,340
Int. Cl. B32b *9/06*; C08c *11/70*
U.S. Cl. 161—235 **12 Claims**

A wax laminant composition comprising a major amount of high melting paraffinic wax, a minor amount of ethylene-vinyl acetate copolymer, a minor amount of an amorphous copolymer of alpha-methyl styrene and vinyl toluene, and a

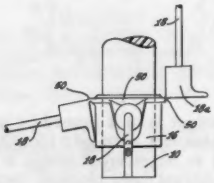
minor amount of oxidized polyethylene. This wax composition provides a laminant with improved high-temperature laminating strength, viscosity suitable for handling in conventional laminating machines, low oil content (i.e., low straining) and good wetting, flow, and vapor barrier properties.

3,616,107

SECTIONALIZED ARTIFICIAL TREE STRUCTURE WITH INTEGRAL BRANCH AND COLLAR COMBINATIONS

William A. Kershner, Azuza, Calif., assignor to HPE Inc., Colton, Calif.

Filed Mar. 20, 1969, Ser. No. 808,915
Int. Cl. A47g *33/04*
U.S. Cl. 161—24 **2 Claims**



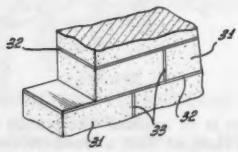
A sectionalized artificial tree structure is provided which is intended, for example, to simulate a Christmas tree, and which is constructed of an appropriate pliant plastic material so that its component parts may be fabricated on a mass production low-cost basis; and in which the individual component parts include integral branch and collar combinations which may be conveniently collapsed for shipping and storing purposes.

3,616,108

REFRACTORY CONSTRUCTION UNITS WITH HIGH-TEMPERATURE BONDING JOINT FILLERS AND METHOD OF MAKING SAID UNITS

William E. Whitehouse, La Crescenta, and Roger R. Riley, Glendale, both of Calif., assignors to Interpace Corporation, Los Angeles, Calif.

Continuation-in-part of application Ser. No. 699,345, Jan. 22, 1968, now abandoned. This application Sept. 13, 1968, Ser. No. 759,739
Int. Cl. B32b *3/10*
U.S. Cl. 161—36 **13 Claims**



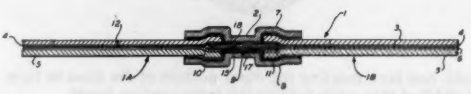
Means for facilitating setting and construction of furnaces, kilns, ladles and similar equipment units subjected to high temperatures, comprising a resilient, compressible, elastomeric composition composed essentially of an organic plastic containing a finely divided heat-resistant inorganic filler dispersed therein. The composition acts as a sealant and bonding agent between refractory blocks and metallic elements of construction units and has utility as an expansion joint filler. The invention also relates to refractory construction units provided with adhering elastomeric composition surface layers having heat-resistant inorganic fillers adapted to act as bonding joint fillers under high temperatures of use, and method of making self-sealing refractory ceramic construction units.

3,616,109

SPLICE FOR PRESSURE-SENSITIVE ADHESIVE STOCK

Frank Miro, Huntington Station, N.Y.; Beverly M. Eagon, Scranton, and Seth Wheeler, Clark-Summit, Pa., assignors to Fitchburg Coated Products Inc., Moosic, Pa.

Filed June 18, 1969, Ser. No. 834,361
Int. Cl. B32b *3/10*
U.S. Cl. 161—36 **4 Claims**



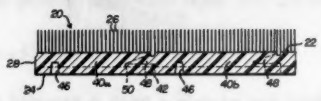
A slice for pressure-sensitive label stock including an insert member sandwiched between the adhesive and the release coat of the stocks to be joined. Splicing tapes are used to join the two sections of stock while the insert member prevents the tapes from fusing in the edge areas where the two stocks do not perfectly abut. The insert member includes at least two layers with at least one of the layers releasably adhered to the release coat thereby permitting ready removal of the matrix formed after diecutting labels from the stock.

3,616,110

PROGRESSIVE INJECTION MOLDED SHEET AND METHOD OF AND APPARATUS FOR MAKING THE SAME

Louis F. Kutik, 8720 S.W. 23rd Pl., Fort Lauderdale, Fla., and Erich W. Gronemeyer, 3430 Galt Ocean Drive, Fort Lauderdale, Fla.

Filed May 16, 1968, Ser. No. 729,694
Int. Cl. B32b *3/10*; D03d *27/00*; B29c *19/00*
U.S. Cl. 161—37 **8 Claims**



A plastic sheet is disclosed which is made up of injection molded sections molded progressively and joined together at edges thereof during the molding process. The sheet may have integral bristles on one side thereof making it useful as a rug or carpet, but other uses of the invention are contemplated. The method includes the molding of plastic sections such that as each section after the first one is molded it welds to a previously molded section at an edge thereof, and the sections are advanced after each molding step so that a trailing edge of the last molded section seals the mold exit. The trailing edge may be provided with a thin flange which is softened by the molten material so that a weld is formed. Shrinkage of the plastic is controlled to prevent leakage of molten plastic from the mold around the last molded section and also to prevent buckling of the sheet. This is preferably done by providing keys in the mold which harness the plastic to the mold. Pins in the mold are used to form indentations in the sections to facilitate advancing the sections. Other pins slightly oversize in diameter and length serve as a lock for accurate alignment of the sections and also serve a sealing purpose.

3,616,111

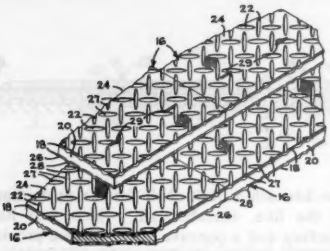
PLASTIC LANDING PAD OF INTERCONNECTED PANELS

Harry Raech, Jr., San Jose, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Feb. 27, 1969, Ser. No. 802,827
Int. Cl. B32b *3/30*
U.S. Cl. 161—37 **8 Claims**

A landing pad for helicopters is made of individual laminated panels having top and bottom laminae of woven

fiberglass and a relatively thick core lamina of a nonwoven organic fiber which is bonded to the said top and bottom laminae by a polyester resin extensively impregnated with a particulate filler. Upper and lower surfaces of the panels are textured with matching recesses and protuberances



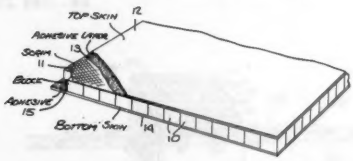
respectively which give the panels an interlocking characteristic that is effective when the panels are laid upon one another in separate layers. In final form the layers of laminated panels are stapled together to give a cohesive landing pad of high durability.

3,616,112

BALSA WOOD CORE IN A LAMINATED STRUCTURAL SANDWICH

Ramesh R. Desai, New Providence, N.J., assignor to Balsa Development Corporation, New York, N.Y.

Filed Aug. 29, 1969, Ser. No. 854,076
Int. Cl. B32b *3/18*
U.S. Cl. 161—37 **6 Claims**



A tessellated contour core blanket for use in structural laminates, the blanket being constituted by an array of blocks, preferably of end-grain balsa, adhesively secured to an open mesh scrim, the exposed ends of the blocks being sealed to prevent the admission therein of moisture or resin, whereby the blanket may be stored for prolonged periods without blanket warpage, and the blanket may thereafter be laminated to facing skins without printout effects.

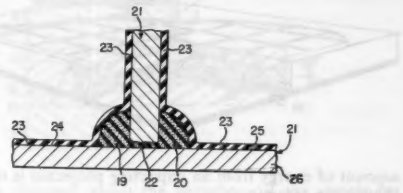
3,616,113

POLYURETHANE LAMINATE AND METHOD OF FORMING SAID LAMINATE

John M. Sawyer, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed June 17, 1969, Ser. No. 834,021
Int. Cl. B32b *1/06, 3/26, 27/40*
U.S. Cl. 161—39 **6 Claims**

A laminate of at least two layers including at least one flexible coating layer composed of a polyurethane composition for sealing separations in substrate layers, such as structural members, and the method of forming these laminates. The flexible coating layer covers adjacent surfaces of the substrate layer and the separation and is adhered to the substrate layer except in areas immediately adjacent to and directly over each separation, thus forming at least one nonadhering portion of the coating layer so that when the substrate layer moves due to thermal or mechanical forces substantially all of any stress associated with such movement is distributed over each nonadhering portion to prevent a concentration of stresses which would rupture the coating layer. The laminates of this invention are particularly useful



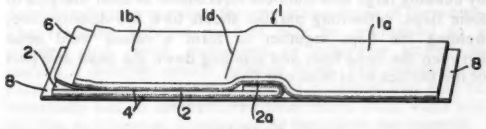
for sealing separation in the bulkhead compartment of ships, and the flexible coatings of such laminates are composed of polyurethane compositions having resistance to fuels and water hydrolysis.

3,616,114

REUSABLE COMPOSITE ADHESIVE SEALING TAPES

Tsuneji Hamaguchi, Osaka, and Hajimu Tanaka, Suita, both of Japan, assignors to Daiei Shikogyo Kabushiki Kaisha, Hirakata; Tanaka-ya Shojii Kabushiki Kaisha and Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan, part interest to each

Filed Mar. 15, 1968, Ser. No. 713,347
Claims priority, application Japan, Mar. 15, 1967, 42/21607
Int. Cl. B32b *3/04*
U.S. Cl. 161—39 **11 Claims**



Reusable, composite, adhesive sealing tapes for releasably interconnecting container parts and the like, such as corrugated boxes, paper bags, etc. The tapes, cut to a suitable length and width, include at least two tape portions or laminations, namely a main tape portion and a partly coplanar reinforcing tape portion; optionally, an auxiliary tape portion may also be provided.

The inner end of the reinforcing portion is firmly attached to the midportion of the main portion. The latter has a first area adapted to be attached to one side of a first container part, while a second area thereof, including its free end, is adapted to be attached to a second container part which should be releasably interconnected with said first container part; the reinforcing portion is at least partly attachable to the opposite side of the first container part. A turned-up section formed from the inner end of the reinforcing portion may constitute a hinge for said first area of the main portion when it is attached to the respective container part.

3,616,115

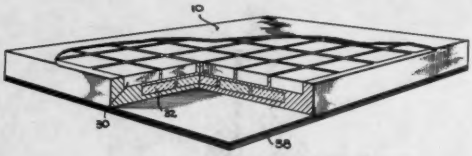
LIGHTWEIGHT BALLISTIC ARMOR

Norman Klimmek, Palos Verdes Estates, Calif., assignor to North American Rockwell Corporation

Filed Sept. 24, 1968, Ser. No. 762,044
Int. Cl. F41h *5/04*
U.S. Cl. 161—39 **5 Claims**

A lightweight composite armor plate is disclosed wherein successive layers of small discrete ceramic blocks are encapsulated within a metallic matrix by solid-state diffusion

bonding. Residual stress effects from the bonding step prestress the blocks in compression, whereby a greater



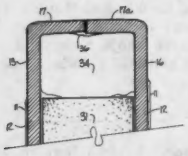
amount of energy from an impacting projectile is required to shatter the ceramic.

3,616,116

PANEL STRUCTURE OF METAL SHEETS ENCLOSING A LOW DENSITY CORE

Ronald J. McDonald, 10 Evergreen Ave., New Rochelle, N.Y.

Filed June 18, 1969, Ser. No. 834,273
Int. Cl. B37b *15/18*
U.S. Cl. 161—39 6 Claims



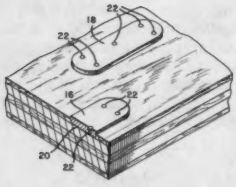
Tables and other articles of furniture having closely spaced-parallel substantially flat smooth stainless steel surfaces of substantial area joined by integral narrow transverse smooth stainless steel surfaces. They may be made by bending large thin stainless steel sheets at their margins to form flaps, cementing parallel sheets to a low-density core, welding the flaps together to form a raised weld bead between the bend lines and grinding down the bead and part of the surface of at least one flap.

3,616,117

METHOD OF PATCHING PLYWOOD PANELS AND THE PANEL PRODUCED THEREBY

Carol Dwight Anderson, Salem, Oreg.; Gerald Mack Wilson, Lyons, Oreg.; Robert Kenneth Molloy, Bayside, and Kenneth Floyd Durant, Arcata, Calif., assignors to Simpson Timber Company, Seattle, Wash.

Filed Mar. 29, 1967, Ser. No. 626,859
Int. Cl. B32b *7/08, 35/00*
U.S. Cl. 161—41 3 Claims



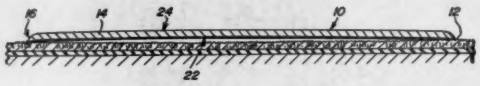
Defects in the surfaces of plywood panels are routed and wood patches, with glue applied to their undersides, are seated in the routed-out sections of the panels. The patches are held in place in uniform contact with the routed-out panel sections by plastic tacks so that a cold-setting glue can be employed to bond the patches to the panels regardless of patch size.

3,616,118

PRESTRESSED FLOOR-COVERING PROTECTOR MAT

William Dwight Porter, 3002 Avenue L., Council Bluffs, Iowa

Filed July 12, 1968, Ser. No. 744,385
Int. Cl. B32b *1/04*; B61l *11/02*
U.S. Cl. 161—44 2 Claims



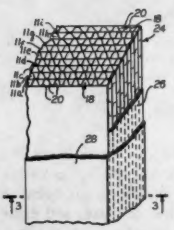
A mat for use beneath a desk chair for the protection of carpeting, and the like, therebeneath, which mat has a convex upper surface and a concave lower surface providing downwardly disposed peripheral edge portions for grippingly engaging the pile of the carpet upon which the mat rests while also facilitating the movement of a desk chair on an off the mat, as required, and further significantly reducing the possibility of a person catching their foot on the edge of the mat when stepping onto the mat. The underside of the mat is characterized by a multitude of downwardly projecting fibrous tentacles and intersecting scoring which materially assist the downwardly disposed peripheral edge portions in stabilizing the mat against sliding movement relative to the carpeting upon which it is utilized.

3,616,119

LIGHT CORE LAMINATED STRUCTURE

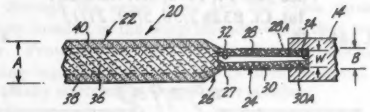
Edward Wukowitz, 29 Wells Ave., Congers, N.Y.

Filed Mar. 27, 1968, Ser. No. 716,371
Int. Cl. B32b *3/00, 3/28*
U.S. Cl. 161—43 7 Claims



This specification discloses a laminate structure having a multi-ply corrugated board core to which coating is applied in such a way as to prevent delamination. The core is made of core unit sections that are cut from a block in a direction to have the flute passages exposed through the top and bottom faces of each core unit section. Some of the flute passages of the core slope in one direction and others slope in the opposite direction at acute angles to the face of the core to which the coating is applied. The coating extends into the flute passages for a part of their length and thus forms an undercut key structure that locks the coating to the core unit sections. There can be no delamination unless these keys break or the flutes tear, and because of the large number of keys and flutes (which may be up to 40 to 50 per square inch), a strong connection is obtained. The structure is used for curved laminates such as fiberglass boat hulls, and in the preferred construction the core is made of sections of substantially greater length than width and disposed so that the curvature is in the direction of the width of the sections. Units can be originally cut with lengthwise curvature so that no bending is required.

3,616,120
PANEL PRODUCT
Charles Herbert Warwick, Eugene, Oreg., assignor to Fibreboard Corporation, San Francisco, Calif.
Filed Apr. 24, 1968, Ser. No. 723,797
Int. Cl. B32b 1/04; E04c 1/10
U.S. Cl. 161—44 4 Claims



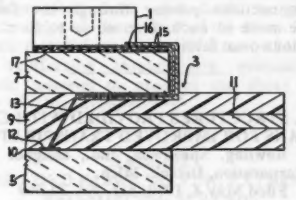
A decorative panel product formed through compressing and consolidating a mat of loosely organized, bondable wood particles. The panel includes a medial portion having one thickness and one density, and a marginal portion having a substantially lesser thickness and a greater density than the medial portion. The panel's marginal portion is slotted, whereby a pair of spaced substantially parallel flanges are defined which can be squeezed toward one another to facilitate fitting the extremities of the marginal portion into grooves in a supporting framework.

3,616,121
COMPOSITE IDENTIFICATION CARD
Jackson S. Freundlich, So. Orange, N.J., assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio
Division of Ser. No. 592,169, Nov. 4, 1966, Pat. No. 3,475,247
Filed July 23, 1969, Ser. No. 844,137
Int. Cl. G09f 3/02; B32b 3/02
U.S. Cl. 161—44 2 Claims

A pouch having at least one side transparent so as to visually expose material inserted in the pouch, and the pouch formed of two sheets united by bonding around the edges. The bonded edges are sufficiently stiff such that cutting away part of the edge leaves tab sections remaining which serve to identify the contents of the pouch for use in data machines.

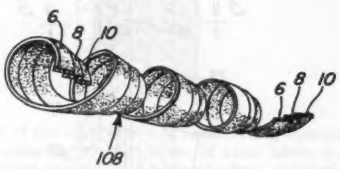
3,616,122
LAMINATED WINDOW PANELS
Dee R. Orcutt, Natrona Heights, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.
Continuation of application Ser. No. 575,188, Aug. 25, 1966, now abandoned, which is a continuation of application Ser. No. 299,582, Aug. 2, 1963, now abandoned, which is a Continuation-in-part of Ser. No. 275,448, Apr. 24, 1963, abandoned, which is a Continuation-in-part of Ser. No. 261,996, abandoned
Filed June 30, 1969, Ser. No. 841,682
Int. Cl. B32b 3/02; D03d 11/00
U.S. Cl. 161—45 10 Claims

Laminated window panels comprised of an assembly of rigid, transparent sheets bonded together by plastic interlayer material and utilizing fiber glass reinforced thermosetting resinous material in marginal areas of the panels outside their viewing area (1) as protection for electrical terminal blocks and lead wire connections, (2) as interlayer inserts for the prevention of delamination and/or cold chipping and for reinforcing the interlayer material, and (3) as edge frames or



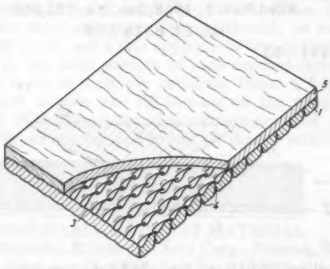
channeling disposed about the periphery of the panels for edge and interlayer protection.

3,616,123
HELICOID LAMINATE COMPRISING SEVERAL CONTINUOUS TIERED STRIPS
Harold J. Reynolds, Jr., Raritan; George P. Leistensnider, Somerville, and Angelo A. Forte, Raritan, all of N.J., assignors to Johns-Manville Corporation, New York, N.Y.
Filed Jan. 29, 1968, Ser. No. 701,424
Int. Cl. F16l 9/14, 59/02
U.S. Cl. 161—47 10 Claims



Helicoid products comprising several continuous tiered strips are made by superposing at least two continuous strips with their edges overlapped, incurvating the strips and durably adhering together the contacting faces of the strips. The resulting helicoid product may be conformed to a mandrel and cured, vulcanized or otherwise treated to acquire a durable tubular helicoid form. This technique is particularly useful in making helicoid coverings that may be repeatedly put on and removed from tubes, rods, wires and the like, as coverings, firesleeves, or insulation, for example.

3,616,124
COMPOSITE NONWOVEN FABRIC
Antonin Danhel, and Vaclav Mrstina, both of Brno, Czechoslovakia, assignors to Vyzkumny ustav pletarsky, Brno, Czechoslovakia
Filed May 27, 1969, Ser. No. 828,119
Claims priority, application Czechoslovakia, May 31, 1968, 40 06-68
Int. Cl. B32b 5/06
U.S. Cl. 161—50 8 Claims



A composite nonwoven fabric composed of a plurality of superimposed nonwoven fibrous textile layers. This fabric

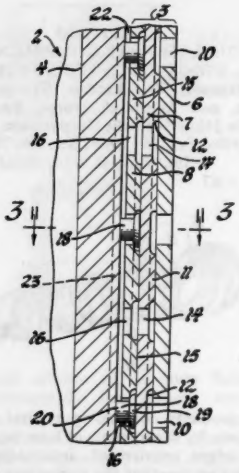
includes spaced-apart rows of chain-loops of threads consisting of the same type of fibers as the respective outer layer; these threads serving for reinforcing the respective outer layer. The fabric also includes a plurality of spaced needling connections passing through the fabric layers, securing the same to each other so as to form a coherent composite nonwoven fabric.

3,616,125

AIRFOIL STRUCTURES PROVIDED WITH COOLING MEANS FOR IMPROVED TRANSPIRATION

Charles E. Bowling, Speedway, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed May 4, 1970, Ser. No. 34,369
Int. Cl. B32b *3/06*
U.S. Cl. 161—53 **8 Claims**



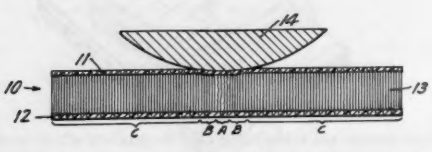
An airfoil has a structural core and a facing mounted on the core. The facing is in at least two layers with structure which defines cavities between these layers and holes through the layer nearest the core. Headed buttons trapped in the holes with stems extending through the holes are fixed to the core to retain the facing on the core. These buttons are mounted in the facing with some clearance so that relative expansion of the core and facing may occur. The facing may be porous. The core may include special provisions for bringing cooling air to the facing.

3,616,126

COMPRESSION ENERGY ABSORBING STRUCTURE

Barry F. Tungseth, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 1, 1968, Ser. No. 772,669
Int. Cl. B32b *7/08*
U.S. Cl. 161—53 **11 Claims**



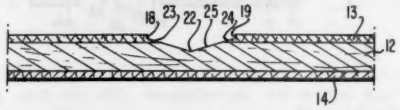
A padlike structure for absorbing compressive forces comprising two elastomeric sheets disposed in substantially parallel relationship and interconnected by closely spaced polymeric filament segments disposed normal to the plane of the structure. The structure absorbs and stores energy imparted to it by means of a loading head, either the head or the structure having a convexly curved surface.

3,616,127

GROOVED PLYWOOD PANELING

Kenneth W. Guenther, Portland, Oreg., assignor to Georgia-Pacific Corporation, Portland, Oreg.

Filed Jan. 14, 1970, Ser. No. 2,831
Int. Cl. B32b *3/30, 5/12, 21/13*
U.S. Cl. 161—56 **4 Claims**



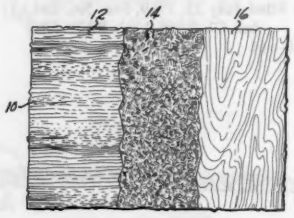
Prefinished plywood wall paneling having a face layer with a plurality of elongated and wide grooves which have a spacing and configuration giving the panel the feel and the appearance of a plurality of separate boards.

3,616,128

DIMENSIONALLY STABLE HARDWOOD PANEL AND A METHOD OF FORMING THE SAME

Norman E. Pacourek, Marshfield, Wis., assignor to Weyerhaeuser Company, Tacoma, Wash.

Continuation of application Ser. No. 667,683, Sept. 14, 1967, now abandoned. This application July 24, 1970, Ser. No. 64,060
Int. Cl. B32b *21/12*
U.S. Cl. 161—56 **7 Claims**



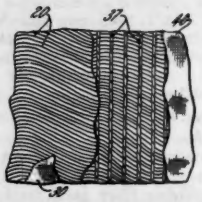
A dimensionally stabilized plywood panel having an inner core of force-resistant material, face and back plies, the back ply having a grain direction perpendicular to the face ply.

3,616,129

LONGITUDINALLY STRETCHABLE NONWOVEN MATERIAL

Karl E. Sager, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Apr. 7, 1969, Ser. No. 813,982
Int. Cl. B32b *5/12*
U.S. Cl. 161—57 **7 Claims**



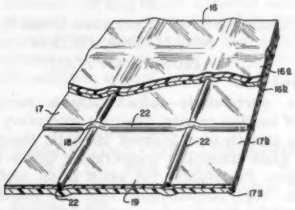
A longitudinally stretchable, nonwoven material and the method of making same are disclosed. A plurality of spaced-

apart, substantially parallel warp threads are drawn from their respective supply cans and over an adhesive applicator. The warp threads are laterally oscillated and deposited on the surface of a carrier sheet moving into a thread cross-laying apparatus to produce a generally sinusoidal pattern of threads on the carrier sheet. A plurality of spaced-apart, substantially parallel cross threads are then laid generally straight across the carrier sheet in a transverse direction as it moves through the cross layer and the cross threads are adhesively bonded to the warp threads where they cross one another. Provision is also made for introducing and laminating top and bottom layers of sheet material to the longitudinally stretchable, nonwoven material.

3,616,130
REINFORCED PLASTIC MATERIAL

John E. Rogosch, Baton Rouge, La., and Floyd B. Williams, Middletown, Ohio, assignors to Ethyl Corporation, New York, N.Y.

Continuation-in-part of application Ser. No. 634,560, Apr. 28, 1967, now abandoned. This application Sept. 27, 1967, Ser. No. 670,916
Int. Cl. B32b *5/12, 31/04*; C09i *7/02*
U.S. Cl. 161—57 **12 Claims**

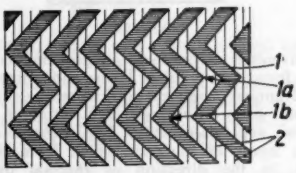


A flexible, reinforced laminated plastic sheet material made from two sheets of multilayer thermoplastic material having a web of reinforcing strands received therebetween. The two sheets of material are bonded to each other in the interstices provided in the web. The contacting side of each sheet of material is composed of a layer of a thermoplastic having a lower melting point or sealing temperature than the outer layer of the multilayer thermoplastic material. The inner layers are bonded to each other without the use of any adhesive by passing the two sheets and the enclosed web between rotating heated laminating rolls.

3,616,131
FABRICATED THERMOPLASTIC SHEET MATERIALS FOR THE INTERCONNECTION OF LAMELLAR BODIES

Frederik A. Hardick, Enschede, Netherlands, assignor to Luctem Etablissements, Vaduz, Liechtenstein

Filed Dec. 26, 1967, Ser. No. 693,331
Claims priority, application Germany, Dec. 29, 1966, L 55391
Int. Cl. B32b *5/12*
U.S. Cl. 161—57 **6 Claims**



A fabricated thermoplastic sheet material is provided for the interconnection of two or more lamellar bodies such as textile sheet materials, paper or the like. The fabricated sheet material has strips of thermoplastic material interconnected by reinforcing threads which strips adhere and establish connection between the laminar bodies upon application of heat and pressure. An apparatus is also provided for manufacturing the sheet material. The apparatus has a drum mounted for rotation about a horizontal axis and a thermoplastic dispensing device is arranged above the drum and is reciprocated back and forth to produce the thermoplastic strips on the surface of the drum. The strips of thermoplastic material are heated in a zone of the drum and thereafter reinforcing threads are pressed into the thermoplastic material to produce the sheet material in accordance with the invention.

3,616,132
TIRE CORD FABRIC HAVING EXTERNAL REINFORCING STRANDS

Werner W. Klingbeil, Paterson, N.J., and Eugene H. Hartman, Venice, Fla., assignors to Uniroyal, Inc., New York, N.Y.

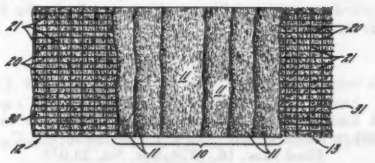
Filed Mar. 18, 1968, Ser. No. 713,935
Int. Cl. B32b *5/12, 5/28*
U.S. Cl. 161—58 **10 Claims**

Distortion of tire cord fabric in tire-building operations is avoided by adhering to the pieces of cord fabric external strands arranged parallel to the lateral edges of the piece to reduce the stretch of the cord fabric, the strands taking longitudinal stresses as the pieces are pulled in the tire-building operation.

3,616,133
HEAVY-DUTY WIPE

Gordon D. Thomas, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Dec. 23, 1968, Ser. No. 788,987
Int. Cl. B32b *5/12*
U.S. Cl. 161—57 **6 Claims**



An improved heavy-duty wipe made of nonwoven materials, and a method of producing the same. The wipe includes a central layer of multi-ply cellulosic tissue, a web or sheet of open mesh nonwoven crossed threads on each side of the central layer, and a thin applique of fine fibrous material bonded to the outer surface of each crossed-thread web. The central layer of multi-ply cellulosic tissue is bonded to both the warp threads and fill threads on the warp thread side of each of the two webs of nonwoven material, and the fibrous appliques are bonded to the fill thread sides of each web.

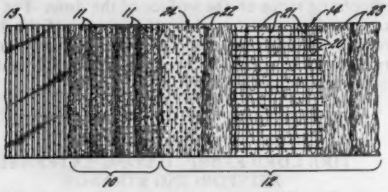
3,616,134
DISPOSABLE BATHMAT MATERIAL

Carlton L. Palenske, Kimberly-Clark Corp., Neenah, Wis.

Filed Apr. 1, 1969, Ser. No. 813,808
Int. Cl. B32b *5/12*
U.S. Cl. 161—57 **13 Claims**

A disposable laminated bathmat having a central layer of absorbent cellulosic wadding, with a layer of plastic film

laminated to one side of the wadding as a water barrier, a layer of nonwoven fabric bonded to the other side of the central layer to provide strength and abrasion resistance, and

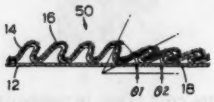


a layer to provide strength and abrasion resistance, and a layer of cellulosic tissue bonded to the other side of the nonwoven fabric.

3,616,135
CARPETLIKE MATERIAL

Silvano Tesainer, Grand Mere Inn, Grand'mere, Quebec, Canada, and Micahel C. Wilkinson, 9216 Radiom Drive, St. Louis, Mo.

Continuation-in-part of application Ser. No. 716,584, , now abandoned. This application Mar. 21, 1969, Ser. No. 809,294
Int. Cl. B32b *3/28*
U.S. Cl. 161—63 **11 Claims**



The present invention relates to an inexpensive carpetlike material and the preferred embodiments described in the disclosure are in the form of a corrugated paperboard base member to which a flock coating of fibrous material is adhesively secured to form a pilelike coating. The flock coating is applied by an electrostatic flocking process. The various types of base members described include: single-faced corrugated paperboard, double-faced corrugated paperboard having an embossed upper liner member and corrugated paperboard wherein the flutes of the corrugated medium are angularly inclined relative to the liner to provide increased resilience. The flock coating may be applied directly to the exposed corrugated surfaces or it may be applied directly to the exposed corrugated surfaces or it may be applied to an upper linear which may be in the form of a porous net.

3,616,136
FLOCKED FABRICS

Frank Endrenyi, Jr., Spartanburg, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Filed Mar. 16, 1970, Ser. No. 20,035
Int. Cl. B32b *27/04, 27/14;* **C08f** *29/56*
U.S. Cl. 161—64 **5 Claims**

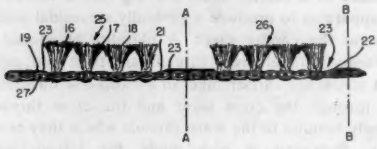
The disclosure described novel adhesive compositions having improved cold flex characteristics and solvent resistance. The adhesive composition comprises a combination of a particular type of water-insoluble, self-cross-linking acrylic polymer and an acid polymer. These adhesives are useful in the usual applications and, in particular, in preparing laminated fabrics and flocked pile fabric.

3,616,137
PILE WEATHERSTRIPPING WITH MONOFILAMENT THERMOPLASTIC BACKING

Robert C. Horton, Rochester, N.Y., assignor to Kessler Products Co., Inc., Youngstown, Ohio

Filed Nov. 3, 1969, Ser. No. 873,315
Int. Cl. D05c *17/02;* **E06b** *7/16*
U.S. Cl. 161—66 **4 Claims**

A pile weather stripping is provided having a tape fabric of monofilament thermoplastic yarn, heat-welded along the tape edges to prevent ravelling. The weatherstrip is of the type having a central longitudinally extending woven pile area and two bare side areas for insertion into slots. The woven pile



may also be heat-welded to the fabric on the back side of the tape, and the bare side areas may be formed from originally all-pile material by heat-melting and crushing flat the pile along these side areas to fuse the pile and fabric together.

3,616,138
CARPET STRUCTURE WITH FOAMED SECONDARY BACKING

Victor Harold Wentworth, Uxbridge, England, assignor to Monsanto Chemicals Limited, London, England

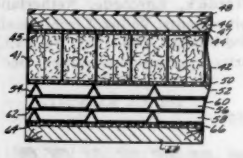
Continuation of application Ser. No. 506,400, Nov. 4, 1965, now abandoned. This application Aug. 12, 1969, Ser. No. 871,757
Claims priority, application Great Britain, Nov. 23, 1964, 47533/64
Int. Cl. D05c *17/02*
U.S. Cl. 161—67 **5 Claims**

Carpets, particularly tufted carpets having a primary backing of hessian or jute, having a secondary backing which comprises an extruded foamed aliphatic thermoplastic resin having a glass transition temperature below ordinary room temperature. Preferably, the resin is an olefin polymer or copolymer, e.g., polyethylene, and the foamed resin has a predominantly closed cell structure, the majority of the cells having a diameter of 0.002–0.1 inch. The foamed resin can be up to 0.5-inch thick; can be in the form of a continuous sheet, a woven fabric or net, or a plurality of adjacent sheets; and, if desired, can be perforated, corrugated, or embossed. It can be fastened to the back of the carpet in any convenient manner, e.g., by sewing it in place or by adhering it by means of a suitable adhesive such as a pressure-sensitive adhesive, a latex adhesive, or a heat-sensitive adhesive.

3,616,139
MULTILAYERED THERMAL INSULATORS

Peter Jones, 221 Verde Oak Drive, Hollywood, Calif.

Filed Jan. 21, 1969, Ser. No. 792,498
Int. Cl. B32b *3/12*
U.S. Cl. 161—68 **1 Claim**

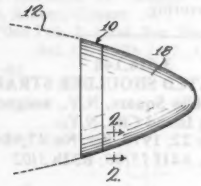


This invention relates to improvements in thermal insulators formed of multiple layers and which are arranged to take advantage of reflection while minimizing heat loss by conduction and affording high strength to oppose compressive and other forces. The embodiment illustrated comprises layers of material which form dead air cells separated, in the direction of thermal differential, by reflective coatings and layers. The walls that comprise the dead air cells of one layer are offset from the walls that comprise the dead air cells of another layer. In one embodiment the several layers are formed of honeycombed material. In another embodiment, the dead air cells of one layer are formed by honeycomb material and the dead air cells of other layers are formed by embossed reflective material.

3,616,140
RAIN EROSION RESISTANT MATERIAL FOR AIRBORNE VEHICLE

Robert L. Copeland, and Vance A. Chase, both of Marion, Va., assignors to Brunswick Corporation

Filed May 17, 1968, Ser. No. 730,027
Int. Cl. B32b 3/12; H01q 1/42
U.S. Cl. 161—68 6 Claims

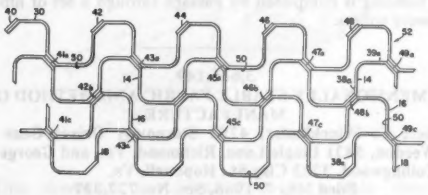


A radome or other like structure defining a leading edge of an airborne vehicle, which is of light weight and formed to close tolerances, including a reinforced plastic shell which may be of glass fiber reinforced epoxy or polyester laminate, and a preformed rain erosion resistant coasting or "boot" of thermoplastic material on the outer exposed surface. The thermoplastic material is a preformed coating having high electrical transparency or transmissability and good abrasion and impact resistance. The coating can be secured to the shell by a suitable adhesive system.

3,616,141
FORMABLE HONEYCOMB CORE AND METHOD OF MAKING THE SAME

Donald C. Anderson, Lafayette, Calif., assignor to Hexcel Corporation, Dublin, Calif.

Filed Dec. 15, 1969, Ser. No. 884,862
Int. Cl. B32d 3/02; B32b 3/12
U.S. Cl. 161—68 10 Claims



A pack of honeycomb core material which is expandable to a nonplaner contour, the pack including a plurality of ribbons having undulating corrugations providing alternate zenith and nadir points, selected areas intermediate the zenith and nadir points being bonded to each other whereby the pack may be expanded to form a plurality of multiangular hollow cells.

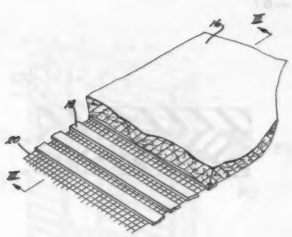
3,616,142
STRUCTURAL LAMINATE FOR SEATING AND THE LIKE

Albert Schrotenboer, Grand Rapids, Mich., assignor to Sackner Products, Inc., Grand Rapids, Mich.

Filed Sept. 26, 1968, Ser. No. 762,813
Int. Cl. D03d 3/00; B32b 5/02
U.S. Cl. 161—71 7 Claims

This disclosure relates to a structural laminate useful for constructing upholstered items such as furniture and seating for vehicles and the like. The laminate comprises a relatively thick layer of cushioning material and a bottom layer formed of a plurality of spaced, relatively stiff strips of material held together and to the side of the cushioning material by a loosely woven or knit web of starched woven material.

There is also disclosed a laminate-making process comprising the steps of applying glue to flat longitudinal strips, continuously feeding a plurality of the glued strips to the top of a web of padding to form a layer of glue strips on



the batting, continuously applying glue to a web of woven material, applying the glued web of woven material to the layer of glued longitudinal strips, and compressing the laminate thus formed.

3,616,143
BONDED MAT OF STRANDS OF CONTINUOUS GLASS FIBERS

Roland E. Langlois, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation

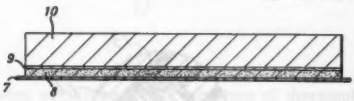
Continuation of application Ser. No. 585,710, Oct. 3, 1966, now abandoned, Division of Ser. No. 231,431, Oct. 18, 1962, Pat. No. 3,318,746
Filed Mar. 24, 1969, Ser. No. 810,921
Int. Cl. B32b 17/02
U.S. Cl. 161—72 1 Claim

A bonded mat of strands of continuous glass fibers with a primary continuous coating preferably of binder material on the fibers, to hold the fibers in strand form, and on the outer surface of the strands and a secondary resinous binder material in particulate form positioned over and fused to the primary coating on the outer surface of the strands and uniformly distributed throughout the mat, the primary coating on the outer surface of the strands and the particulate secondary binder serving together to hold the strands together as a mat.

3,616,144
WALL-COVERING ELEMENTS

Michael J. Kenney, Sutton Coldfield, England, assignor to The Dunlop Company Limited, London County, England

Filed July 6, 1967, Ser. No. 651,552
Claims priority, application Great Britain, July 21, 1966, 32709/66
Int. Cl. B32b 5/02, 5/16
U.S. Cl. 161—83 15 Claims



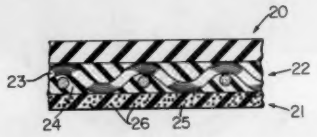
A tile having a core portion of resin-bonded granular filler e.g. resin-bonded sand, and a resin-impregnated fibrous facing layer and backing layer. The facing layer provides the main strength of the tile and can carry high-quality designs. The core provides the bulk of the tile and as it is usually cellular it also provides insulating properties.

3,616,145

MAGNETIZED PRINTING BLANKET

Edward A. Clifton, Waynesville, N.C., assignor to Dayco Corporation, Dayton, Ohio

Filed Aug. 28, 1968, Ser. No. 755,952
Int. Cl. B32b 25/02; B41n 9/00
U.S. Cl. 161—87 12 Claims



A magnetized flexible printing blanket adapted to be self-attached to an associated unmagnetized support comprised of a ferrous material, wherein said blanket comprises an outer ink-receiving layer and an inner layer having a matrix of a rubberlike material and said matrix has a plurality of finely divided particles of magnet material embedded in it to provide optimum flexibility for said blanket.

3,616,146

PREGLUED WALL TEXTILES

Jean A. Gabet, Croix, France, assignor to Societe Anonyme Dite: Etablissements Randon & Immain, Hem (Nord), France

Filed Nov. 28, 1967, Ser. No. 686,098
Claims priority, application France, Dec. 7, 1966, 86,559
Int. Cl. C09j 7/04
U.S. Cl. 161—88 12 Claims

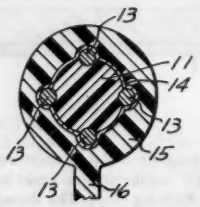
An adhesive sheet material comprising a dimensionally stabilized and water-resistant fibrous carrier, the back of which carries a continuous impermeable film adhering intimately to the carrier yet preserving its suppleness and conferring on it resistance to stretching and preventing it from fraying, a layer of dry adhesive on this film which is compatible therewith and adherent thereto to protect its suppleness against aging, insensitive to moisture, heat and cold, and adapted to be activated by a liquid medium prior to use.

3,616,147

WELT SEAMING LACE ASSEMBLY

Jere B. Ambrose, Birmingham, Mich., assignor to Northern Fibre Products Company, Birmingham, Mich.

Filed June 5, 1970, Ser. No. 43,755
Int. Cl. B32b 5/28, 27/12
U.S. Cl. 161—89 3 Claims



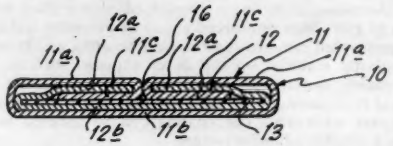
A welt seaming lace assembly, for forming welted seams for upholstered furniture, formed of a thin, flexible, thermoplastic core covered with an open braided mesh formed of thread, and a heat reactable adhesive coating the thread and core, and a thin, thermoplastic, outer covering, including an integral sewing flange, hot extruded around the adhesive coated mesh covered core. The adhesive coating is applied hot to momentarily soften the core for both adhesively bonding to and partially embedding the thread in the surface of the core. Later, after cooling, the extrusion of the outer covering reactivates the adhesive for adhesively bonding the core and threads to and partially embedding the threads in the outer covering.

3,616,148

LAMINATED SHOULDER STRAP

Irving Edelman, Franklin Square, N.Y., assignor to Maidrite Novelty Corp., Long Island City, N.Y.

Filed June 22, 1970, Ser. No. 47,984
Int. Cl. A41f 15/00; B32b 3/02
U.S. Cl. 161—89 4 Claims



A shoulder strap material for articles of feminine wearing apparel has an outer shell or envelope of nylon tricot fabric enclosing a cotton fabric tape to which such shell or envelope is bonded by a hot melt or thermoplastic. In the apparatus for producing such strap material, folded side portions of a nylon tricot fabric tape which constitutes the shell or envelope are urged laterally toward each other to close a longitudinal medial seam of the strap material before the bonding is completed by passage through a set of nip or pressure rollers.

3,616,149

DIMENSIONALLY-STABLE FABRIC AND METHOD OF MANUFACTURE

Robert C. Winckhofer, 4753 Stornoway Drive; Gene C. Weedon, 5431 Lingle Lane, Richmond, Va., and George H. Collingwood, 3202 Clay St., Hopewell, Va.

Filed May 7, 1968, Ser. No. 727,327
Int. Cl. D04h 1/04; D03d 15/02; D02g 3/36
U.S. Cl. 161—89 36 Claims

Articles are manufactured from heat-treated fabric composed of filaments prepared from blended fiber-forming polymers having different chemical properties, at least one of the fiber-forming polymers being dispersed as fibrils in a lower melting point polymeric matrix. The article is produced by preforming the fabric, during production of the fabric itself or by subsequent operation, and heating the latter to a temperature above the melting point of the matrix forming material but below the melting temperature of the dispersed fibrils to set the fabric in its preformed shape. In general the treated fabric is characterized by high stiffness, moldability, dimensional stability, and resistance to mechanical abuse and wrinkling.

3,616,150

LAMINATED ARTICLE

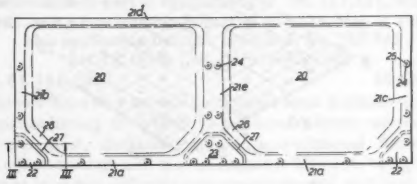
Robert Borge, Lynbrook, N.Y., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Filed Dec. 26, 1967, Ser. No. 693,184
Int. Cl. B32b 7/14; D06m 17/00
U.S. Cl. 161—89 6 Claims

A laminated article comprising an outer layer of a textile fabric and an inner layer of a knitted fabric prepared from a

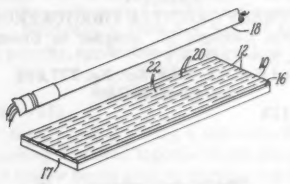
spun yarn, said layers being bonded together with an adhesive. These laminated articles exhibit improved thermal properties.

3,616,151
PLASTIC SHEET HAVING THICKENED MARGINS AND REINFORCED EYELETS IN MARGIN AREAS
Gabriel Racopoulos, Athens, Greece, assignor to Elliniki Kiomihania Plastikon II "Ebepy" Anonyms Eteria, St. John Rentis, Athens, Greece
Filed Feb. 2, 1968, Ser. No. 702,608
Int. Cl. B32b *3/02, 3/10*
U.S. Cl. 161—44 **5 Claims**



A reinforced plastics sheet having integral anchorage points around its periphery and a method of manufacturing such a sheet by passing plastics material between recessed rolls.

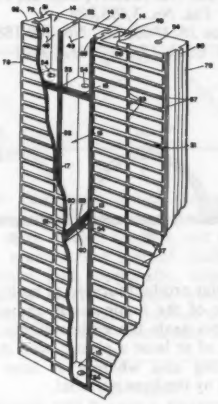
3,616,152
RESIN FILMS
Edmond A. Chandler, Winchester, Mass., assignor to USM Corporation, Boston, Mass.
Filed May 31, 1968, Ser. No. 733,576
Int. Cl. B32b *3/10*
U.S. Cl. 161—109 **7 Claims**



This invention is concerned with a thin film of thermoplastic resin adhesive with a special arrangement of slits or cuts and a method of adhesive deposition or bonding in which the film of adhesive is applied to one surface, heat is applied to bring the adhesive to active condition and cause the film to assume a pattern directly related to the arrangements of slits or cuts and particularly effective for bonding.

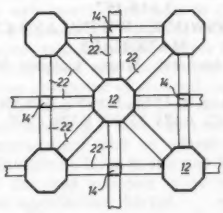
3,616,153
HOLLOW STRUCTURE OF STACKED SHEETS
Martin L. Downs, Appleton, Wis., assignor to Thilmany Pulp and Paper Company, Kaukauna, Wis.
Filed Mar. 10, 1969, Ser. No. 805,646
Int. Cl. B32b *3/12;* **E04c** *2/24*
U.S. Cl. 161—113 **2 Claims**

A hollow structure is formed of thin sheets of material such as, for example, paper, paperboard or Gypsum with preformed openings in the sheets. The sheets are stacked in a programmed sequence to define a cavity of a predetermined shape within the interior of the article. The exterior edges of the sheets are also programmed in sequence to define the desired exterior surface for the article such as, for example, a simulated brick wall surface. By appropriately programming the sheets with interiorly disposed portions, it is possible to form and shape internal elements within the hollow cavity. The method of forming the article includes the bonding of the sheets such as, for example, by flooding the hollow cavity



with the bonding agent and permitting penetration of the bonding agent into the stacked sheets.

3,616,154
NONWOVEN OPENWORK NET STRUCTURE OF THERMOPLASTIC MATERIAL
James Dow, Thaxted, Essex; Albert George Patchell, Welwyn Garden City, and Ronald Lloyd, Sawbridgeworth, all of England, assignors to T. J. Smith & Nephew Limited, Hull, England
Filed Mar. 17, 1969, Ser. No. 807,884
Claims priority, application Great Britain, Mar. 20, 1968, 13411/68
Int. Cl. B32b *3/10*
U.S. Cl. 161—113 **10 Claims**



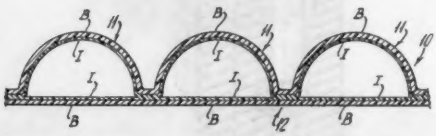
A nonwoven netlike openwork structure of thermoplastic material is provided, comprising a plurality of bosses arranged in a plurality of rows extending substantially uniformly throughout the structure, substantially all of which bosses are integrally joined to at least two other such bosses by bands of thermoplastic material, said bosses being of at least two different configurations, and the area of the structure between the bosses and the bands being substantially devoid of thermoplastic material. If desired the structure may also include portions in which all the bosses are of substantially the same configuration.

3,616,155

CELLULAR LAMINATE MADE FROM TWO THERMOPLASTIC SHEETS HAVING POLYVINYLIDENE CHLORIDE COATINGS ON FACING SIDES OF THE SHEETS

Marc A. Chavannes, New York, N.Y., assignor to Sealed Air Corporation

Division of Ser. No. 336,097, Dec. 26, 1963, Pat. No. 3,405,020
Filed June 26, 1968, Ser. No. 740,188
Int. Cl. B32b *17/34, 27/32, 3/12*
U.S. Cl. 161—119 2 Claims



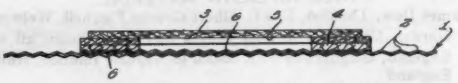
An improved cellular product formed of multiply laminates wherein at least one of the laminates is embossed and the other of the laminates seals the embossments, each of the laminates consisting of at least a plastic base material and a gas-impervious coating and wherein at least one of the coatings is protected by the base material.

3,616,156

TEMPORARY MOUNTING SHEET FOR ADHESIVE-SURFACED ARTICLES

Charles F. Scholl, Wilmette, Ill., assignor to The Scholl Mfg. Co., Inc., Chicago, Ill.

Filed Feb. 25, 1969, Ser. No. 801,970
Int. Cl. B32b *3/30*
U.S. Cl. 161—121 4 Claims



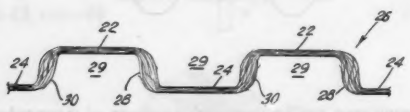
Temporary mounting or backing sheet to which articles having a pressure-sensitive adhesive surface are attached for the protection of the adhesive surface pending removal therefrom for use by the ultimate consumer, such articles being of the general nature of surgical pads such as corn and callous pads, finger bandages, moleskin sheets, and the like.

3,616,157

EMBOSSED NONWOVEN WIPING AND CLEANING MATERIALS

J. Harold Smith, Amherst, Mass., assignor to Johnson & Johnson

Filed Aug. 8, 1969, Ser. No. 848,502
Int. Cl. A471 *25/00*; B32b *3/00*
U.S. Cl. 161—124 15 Claims

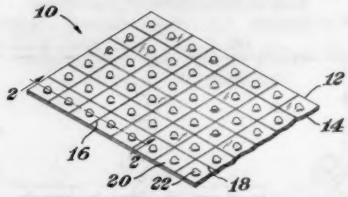


An embossed nonwoven fabric having a textured character and fabriclike qualities of softness and hand and suitable for wiping surfaces having aqueous and/or oleaginous liquids and/or more viscous semisolids thereon comprising a web containing at least one layer of overlapping, intersecting fibers, a pattern of intermittantly spaced, embossed, compacted or densified fibrous areas lying in the planes of both surfaces of said web of overlapping, intersection fibers, and a pattern of unembossed, uncompacted fibrous portions lying between said planes and connecting said embossed, compacted fibrous areas.

3,616,158

CUSHION-PACKAGING MATERIAL, assignor to Louis C. Rubens, Midland, Mich. and The Dow Chemical Company, Midland, Mich.

Filed Sept. 9, 1968, Ser. No. 758,509
Int. Cl. B32b *1/00, 3/26, 27/00*
U.S. Cl. 161—127 10 Claims



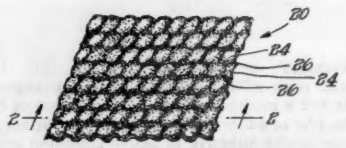
An effective flexible cushion-packaging material is obtained by sealing together upper and lower layers of film in a diamond, rectangular, circular or a like shaped pattern to form a plurality of individual compartments or packets, and encapsulating in each compartment particles of an expandable synthetic resinous thermoplastic material. The particles in their nonexpanded condition occupy a small volume and the composite material can be tightly rolled or packaged in a dense state for shipment or storage. When the material is to be used, it is passed into a heating zone, as for example, between the electrodes of a high-frequency dielectric heating unit to cause rapid expansion of the particles to a low density cellular state.

3,616,159

CONTROLLABLY ORIENTED FIBROUS PRODUCT

Ewald A. Kamp, Chicago, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Filed Nov. 21, 1968, Ser. No. 777,698
Int. Cl. B32b *3/00*
U.S. Cl. 161—128 8 Claims



A nonwoven fibrous pad comprises a three-dimensional network of individual fibers having a surface textured with a pattern of undulating elevations separated by a respective pattern of undulating depressions. Bonding means interconnect the fibers where they cross and contact each other, and each of the elevations comprises a structural dome in which the ratio of cap wall unit weight to average web unit weight is less than 1.0.

The method of making such a fibrous pad includes the step of subjecting an unbonded web of mechanically engaged fibers to successive forming operations between partly meshing, multiply cogged work members relocating fibers from the regions forming the peaks of the elevations to the regions forming the sidewalls thereof.

Apparatus for producing a fibrous pad of the type described comprises a pair of fiber-orienting arrangements, one of which includes means forming a traveling cog surface and the other of which includes a plurality of synchronized cog members meshing successively with the cog surface. One of the fiber-orienting arrangements includes a plurality of closely laterally spaced cog elements having channels

therebetween aligned generally with the direction of travel of the cog surface, and a conveyor belt arrangement is disposed partly in the channels and diverges from a meshed region of the fiber orienting arrangements for feeding a fibrous web into the orienting arrangements or stripping a processed web therefrom.

3,616,160

DIMENSIONALLY STABLE NONWOVEN WEB AND METHOD OF MANUFACTURING SAME

Robert C. Wincklhofer, Richmond; Gene C. Weedon, Richmond, and George H. Collingwood, Hopewell, all of Va., assignors to Allied Chemical Corporation, New York, N.Y.

Continuation-in-part of application Ser. No. 727,327, May 7, 1968, and a continuation-in-part of 727,325, May 7, 1968. This application Dec. 20, 1968, Ser. No. 785,742

Int. Cl. D04h *1/04, 3/14;* **D02g** *3/36*

U.S. Cl. 161—150 **16 Claims**

Nonwoven web materials are formed from multiconstituent filaments having the ability to self-bond without substantial polymer flow, disfiguration, or cross-sectional flattening when heat-treated, said multiconstituent filaments being spun from at least two different polymeric materials such that, in a given filament, a first fiber-forming polymeric material defines a matrix and a second polymeric material is dispersed therein in the form of discontinuous fibrils, said matrix comprising at least 50 percent by weight of the filament and having a lower melting point than said dispersed fibrils. The multiconstituent filaments may be combined with other fibrous or additive materials in a variety of ways depending on the use intended for the web.

3,616,161

TEXTILE AND PAPER LIKE MATERIAL

Herbert Bartl, Cologne, Stammheim, and Frank Wingler, Leverkusen, both of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 3, 1968, Ser. No. 726,600

Claims priority, application Germany, June 30, 1967, F 52828

Int. Cl. B32b *5/16*

U.S. Cl. 161—151 **4 Claims**

A sheet-form product having a thickness from 10μ to 1 mm. comprising a matted together fused plurality of hollow beads, said hollow beads prior to matting and fusing having a diameter of from 10μ to 3 mm. and comprising a copolymer of (a) 70 to 92 parts by weight of vinyl chloride and (b) 30 to 8 parts by weight of ethylene or 30 to 8 parts by weight of a mixture of ethylene and propylene containing 0.1 to 15 parts by weight of propylene. These products are useful as substitutes for paper, fleeces and nonwoven fabrics.

3,616,162

AUTOGENOUSLY INTERCONNECTED AND COMPRESSED POLYSTYRENE PEARLS

Jean H. Noziere, Clermont, France, assignor to Compagnie de Saint, Gobain, Neuilly sur Seine, France

Filed Jan. 21, 1969, Ser. No. 792,402

Int. Cl. B32b *5/08, 5/14, 5/32*

U.S. Cl. 161—133 **10 Claims**

Objects of expanded polystyrene pearls are made in sandwiches of which the layers differ in their constitution, the size of the pearls, their densities and the like. Such objects are stronger, more flexible, and provide better sound and heat insulation than objects of like thickness made from a single type of material. Sandwiches of cellular polystyrene and cellular polysulfone, and sandwiches of different kinds of cellular polystyrene, or different polysulfones exemplify the invention. Novel machinery is provided for making the new materials.

3,616,163

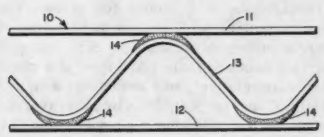
CORRUGATED FIBERBOARD

Abraham J. Reisman, Springfield, Mass., assignor to Atton Box Board Company, Alton, Ill.

Filed July 18, 1969, Ser. No. 843,130

Int. Cl. B32b *3/28, 27/42;* **C08g** *37/16*

U.S. Cl. 161—133 **4 Claims**



Corrugated fiberboard which resists deterioration in strength when in the presence of moisture or water, and intermediate resin treated medium and liner sheet members useful in the manufacture thereof. Such board is made by treating medium and, optionally, liner members with a modified phenol aldehyde resole resin composition and thereafter bonding corrugated medium to liner members with a thermosetting urea-starch-formaldehyde adhesive system.

3,616,164

CONVEYOR BELT AND A PROCESS FOR THE MANUFACTURE THEREOF

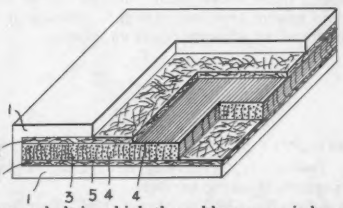
Katsukiyo Tanimoto; Tamio Urakawa, and Sotaro Itadani, all of Kurashiki, Japan, assignors to Kurashiki Rayon Co., Ltd., Sakazu, Kurashiki City, Okayama Prefecture, Japan

Filed Jan. 27, 1969, Ser. No. 794,248

Claims priority, application Japan, Jan. 30, 1968, 43/5568, June 27, 1968, 43/54547

Int. Cl. B32b *3/18, 5/08*

U.S. Cl. 161—141 **13 Claims**



A conveyor belt in which the rubber cover is bonded with the core impregnated with an adhesive, characterized in that the core is a nonwoven sheet consisting of a filamentary layer of longitudinally paralleled synthetic filaments or chemical filaments and web layers of random or carded staple fibers which are superposed on the top and bottom of the filamentary layer, said filamentary layer being composed of substantially nontwisted and noncrimped filaments, and the web layers being composed of crimped staple fibers, that the filamentary layer and the web layers are superposed and integrated by needling, that the nonwoven sheet is sufficiently impregnated with an adhesive, that the weight ratio of the filamentary layer to the web layers ranges 5:1 to 1:1 and that the said adhesive is of rubber-type, and a process for the manufacture thereof.

3,616,165

SUPER-STRONG CORD AND TAPE COMPOSED OF POLYVINYL ALCOHOL FIBERS

Tetsuo Nishi, No. 24-10, 7-chome, Umeda, Adachi-ku, Tokyo, Japan

Filed Apr. 28, 1967, Ser. No. 634,509

Claims priority, application Japan, May 4, 1966, 41/27891, May 4, 1966, 41/27892

Int. Cl. D02g *3/36, 3/40*

U.S. Cl. 161—143 **6 Claims**

Cord and tape composed of continuous polyvinyl alcohol fibers which were highly strengthened by repeatedly immersing in the same kind of polyvinyl alcohol solution.

3,616,166

ADHESIVE COMPOSITION AND BONDED NONWOVEN FABRICS

Louis E. Kelley, Wyncote, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Apr. 1, 1969, Ser. No. 812,416
Int. Cl. C08f *29/46, 29/50;* C09j *3/14*
U.S. Cl. 161—148 6 Claims

This invention is concerned with adhesive compositions having special use as a binder for nonwoven fabrics and comprises a "polyblend," that is an aqueous dispersion of two different polymers obtained by emulsion polymerization. The first component of the polyblend is a polymer of ethyl acrylate having relatively low molecular weight such as from about 150,000 up to 300,000 viscosity average. The other component is an addition polymer made by emulsion polymerization of ethylenically unsaturated monomers comprising one or more members which when homopolymerized tend to produce hard polymers so that the emulsion polymer is one having a minimum film forming temperature (MFT) of at least about 50° C.

3,616,167

STAPLE FIBRE FABRICS AND METHOD OF MAKING THE SAME

Raymond George Gosden, Pontypool, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Mar. 6, 1970, Ser. No. 17,222
Claims priority, application Great Britain, Mar. 12, 1969, 13,022/69
Int. Cl. D04h *1/04*
U.S. Cl. 161—150 9 Claims

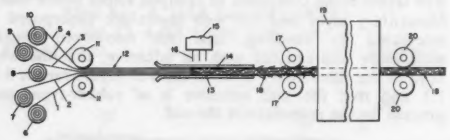
The invention provides for a yarn or fabric containing bicomponent staple fibers wherein the staple fibers comprise two components existing in a sheath/core relationship, the core component having a lower melting point than the sheath component. Upon heat treatment the core component softens and exudes from the cut end portions of the staple fibers and bonds to adjacent fibers on cooling.

3,616,168

NONWOVEN FABRIC FROM PLIES OF PLASTIC

Paul L. Johnstone, Greenville, Del., assignor to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 619,739, Mar. 1, 1967, Pat. No. 3,484,916
Filed Aug. 13, 1969, Ser. No. 862,130
Int. Cl. D04h *13/00, 5/02, 5/08*
U.S. Cl. 161—154 1 Claim



This invention relates to a nonwoven fabric made from a plurality of layers of a uniaxially oriented plastic film which are needled by a group of barbed needles to split the film into filaments, with some of the filaments being broken and the ends thereof worked into the fabric, the present invention being characterized by the use of a composite two-ply film which, after needling, is subjected to heat whereby the free ends of the broken filaments will curl because of the uneven shrink characteristics of the two plies and thus cannot readily be pulled from the fabric.

3,616,169

WEBS AND NONWOVEN FABRICS OF CHROMED COLLAGEN FIBERS

Hiroshi Okamura, Tokyo, Japan, assignor to Kazunori Wakabayashi, Zushi; Hisao Sato, Tokyo and Fuji-Boseki, Kabushiki Kaisha, Tokyo, Japan, part interest to each

Continuation-in-part of application Ser. No. 645,827, June 13, 1967, now abandoned. This application May 28, 1970, Ser. No. 41,516
Int. Cl. B32b *9/02, 5/26;* D04h *1/46*
U.S. Cl. 161—156 6 Claims

Webs or nonwoven fabrics are produced from chromed collagen fiber having mean fiber length of about 1 to 5 cm. which are obtained by chemical or physical treatment of chromed leather. The webs and nonwoven fabrics so produced and articles manufactured therefrom exhibit excellent moisture absorption-release performance which is very similar to that of natural leather. Two or more of the thin sheets of the nonwoven fabric so obtained may be laminated to yield products having varying properties. The fabrics may be preferably used as a base for artificial leather particularly for use in making shoes.

3,616,170

FOAMED SHEET FOR MAKING STIFFENING ELEMENTS

Addison W. Closson, Jr., Proctor Laminar Corp., 32 Clavin Road, Watertown, Mass.

Continuation-in-part of application Ser. No. 847,724, Aug. 5, 1969. This application June 1, 1970, Ser. No. 42,483
Int. Cl. B32b *3/26, 7/00;* A43b *13/42*
U.S. Cl. 161—159 6 Claims

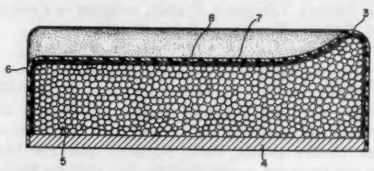
A novel sheet material particularly useful in formation of a stiffening structure for incorporation into shoe counters and the like, the structure comprising a foam sheet and a fabric sheet adherent thereon, the foamed sheet being formed of a thermoplastic elastomer and accounting for the major part of the thickness of the completed element.

3,616,171

METHOD OF MAKING A FOAMED ARTICLE AND SAID ARTICLE

John Donald Hoskinson, Sr., Lancaster, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 3, 1968, Ser. No. 764,703
Int. Cl. B32b *7/04*
U.S. Cl. 161—160 1 Claim



This invention relates to a foamed article having a foamed core and a vinyl resin skin wherein the inner layer of the skin adjacent the foam contains asbestos fibers.

3,616,172

FOAM COMPOSITES FOR FILLING ENCLOSED SPACES

Louis C. Rubens, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jan. 21, 1969, Ser. No. 792,500
Int. Cl. B32b *5/16*; B29d *27/00*
U.S. Cl. 161—161 5 Claims

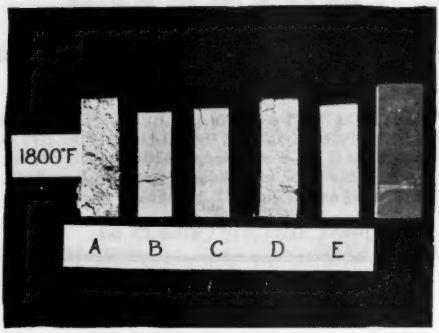
Composites of plastic materials for filling enclosed spaces are prepared by coating the surface of a shaped core material with a layer of expandable resin particles plus a binder such as asphalt. The composite is then placed within the cavity to be filled and heated whereby the rest of the enclosed space is filled with the core material and the expanded particles and binder. The core material may comprise thermostable expandable cellular material. Alternately, the layer of expandable resin particles with the binder can be placed in enclosed spaces in the absence of the shaped core material and expanded to fill the void.

3,616,173

FIRE RESISTANT WALLBOARD

George W. Green, Portland, Oreg., and Donald G. Sundberg, Newark, Ohio, assignors to Georgia-Pacific Corporation, Portland, Oreg.

Filed Aug. 29, 1967, Ser. No. 664,021
Int. Cl. B32b *13/02*; C04b *11/00*
U.S. Cl. 161—162 27 Claims



Fire resistant wallboard having a gypsum core of improved fire resistant properties in combination with relatively low density properties is described. Core compositions having such properties are described as comprising gypsum, glass fibers and either clay, colloidal silica, or colloidal alumina or mixtures thereof. To such core compositions there can also be added unexpanded vermiculite for the purpose of further improving the fire resistant properties of the core.

3,616,174

JOINTS FOR INSULATING ELECTRICALLY CONDUCTIVE SURFACES

John Stuart Atkins, Redditch, England, assignor to Alkaline Batteries Limited, Redditch, England

Filed Oct. 13, 1967, Ser. No. 675,047
Claims priority, application Great Britain, Oct. 17, 1966, 46323/66
Int. Cl. B32b *3/00*
U.S. Cl. 161—162 2 Claims

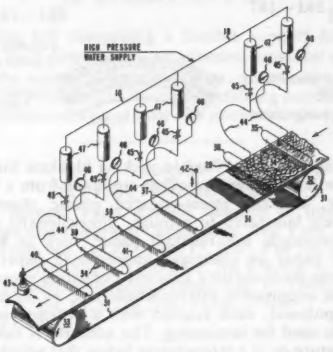
An adhesive for mechanically securing together but electrically insulating two surfaces, which may be electrically conducting, comprising an epoxy resin mixed with small glass spheres.

3,616,175

CHAMOISLIKE NONWOVEN FABRIC

Shee Lup Jung, Wilmington, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del.

Filed June 16, 1969, Ser. No. 833,823
Int. Cl. B32b *5/16*
U.S. Cl. 161—164 5 Claims



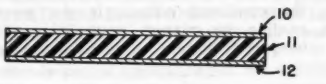
Chamoislike nonwoven fabric weighing between 1 and 9 ounces per square yard is produced from a loose web of rayon fibers of up to 1.0 denier per filament maximum by traversing the web with high energy jet streams of water to entangle the fibers and form a strong, durable fabric characterized by a fiber entanglement completeness of at least 0.6 and a fiber entanglement frequency of at least 30 per inch. A substantially nonpatterned appearance is achieved by supporting the web on a fine mesh screen and oscillating the traversing streams. Properties of the fabric are disclosed to be comparable to chamois for wiping water from surfaces.

3,616,176

POLYAMIDE DECAL

George A. Jachimowicz, Kankakee, Ill., assignor to General Mills, Inc.

Filed Nov. 7, 1967, Ser. No. 681,231
Int. Cl. B44c *1/16*; C09j *7/00*
U.S. Cl. 161—165 7 Claims



There is disclosed a dry thermal transfer decal consisting of a single polyamide film having decoration thereon which film serves as a carrier for the decoration, a protective coating for the decoration and the adhesive layer. The polyamide is the thermal amidification product of essentially equivalent amounts of a polymeric fat acid having a dimeric fat acid content greater than 80 percent by weight and of a diprimary diamine.

3,616,177

LAMINAR STRUCTURES OF POLYIMIDES AND WIRE INSULATED THEREWITH

Carl Gumerman, West Chester, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 17, 1969, Ser. No. 858,890
Int. Cl. H01b *3/44*; B32b *27/30, 27/28*
U.S. Cl. 161—165 4 Claims

A laminar article is provided of a layer of a polyimide and a layer of a fluorinated polymer, which structure is suitable in the form of narrow tapes for electrical insulation uses.

3,616,178
ANCHOR-COATED BIAXIALLY STRESS-ORIENTED PLASTIC SHEET LAMINATED TO RUBBER-COATED PAPER FOR USE AS LETTERPRESS AND OFFSET-PRINTING BLANKET

Emanuel Gurin, Guaynabo, and Antonio Vazquez, Carolina, both of P.R., assignors to David M. Company, Hato Rey, P.R.

Filed Apr. 11, 1969, Ser. No. 815,316
Int. Cl. B32b *27/10*; **B41f** *29/00*; **C09j** *7/02*
U.S. Cl. 161—167 **10 Claims**

Slippage resistant, flexible packing blankets for letterpress and printing blankets for offset are made from a high tensile strength, biaxially stress-oriented plastic sheet which is adhesively laminated to a tough, dimensionally stable, high tensile strength, tear-resistant paper, such as Kraft paper, tympan paper or elastomer impregnated paper sheet. An extensible thermosetting adhesive consisting essentially of an aliphatic copolyester ofterephthalic acid or an elastic ester-amide polymer, each reacted with a polyisocyanate curing agent, is used for laminating. The adhesive is cured at room temperature or at a temperature below that which relaxes the stress-oriented plastic sheet. Superior wear-resistance and high quality of printing have been demonstrated for the blankets of the invention. The blanket is useful as an inking member, for example in letterpress printing of the wraparound press-type, and can also be used for the packing material for the impression cylinder in gravure-type of printing.

3,616,179
GLASS FIBER PRODUCT BONDED WITH TERPOLYMER COMPRISING PHENOL FORMALDEHYDE-UREA FORMALDEHYDE CONDENSATION PRODUCT

Frank P. McCombs, Granville, and James C. Sullivan, Newark, both of Ohio, assignors to Owens-Corning Fiberglas Corporation

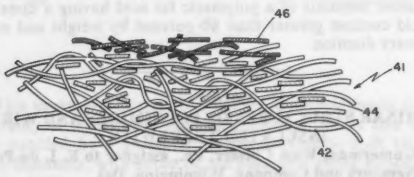
Filed Jan. 18, 1968, Ser. No. 698,724
Int. Cl. B32b *17/10*
U.S. Cl. 161—170 **12 Claims**

A new and improved resinuous binder used in the formation of siliceous batts has been developed by a process comprising the steps of charging a base mix of formaldehyde and phenol into a reactor in the presence of a catalyst, reacting the mixture to a stage wherein some free formaldehyde remains, charging the reactor with raw urea, reacting the combined mixture in the presence of the catalyst, cooling the mixture, neutralizing with acid, and adding subsequently thereto, oil, silane, and water.

3,616,180
SHORT-FIBERED NONWOVEN FABRICS

Nicholas Newman, West Newton, Mass., assignor to The Kendall Company, Boston, Mass.

Filed Nov. 25, 1968, Ser. No. 779,318
Int. Cl. D04h *5/00*; **B32b** *5/16*
U.S. Cl. 161—170 **8 Claims**



A fluid dispersion of ultrashort fibers of from 50 to 300 microns in length is applied to a preformed fleece of textile-length fibers, to increase the opacity of the assembly when it is formed into a nonwoven fabric.

3,616,181
MOLDABLE ARTICLE OF GLASS FIBERS AND A MODIFIED PHENOLIC BINDER

Joseph P. Stalego, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation

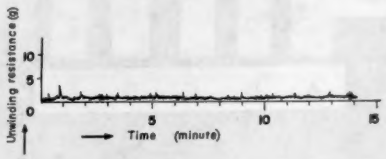
Continuation-in-part of application Ser. No. 783,432, Dec. 12, 1968, now abandoned. This application Nov. 5, 1969, Ser. No. 874,384
Int. Cl. D04h *3/12*; **C08g** *5/00*
U.S. Cl. 161—170 **14 Claims**

A moldable article comprising a woollike mass of intermeshed glass fibers bonded to one another at points of contact by a phenolic binder. The binder is substantially dry and curable, and comprises from 40 percent to 91 percent of a curable phenol-formaldehyde condensate, from 4 percent to 40 percent of urea and from 5 percent to 45 percent of dicyandiamide. Preferably, the binder additionally contains a thickening agent, as well as a siloxane or other release agent and emulsified petroleum oil to minimize sticking and resin build-up during molding of the article.

3,616,182
METHOD FOR PREVENTING FIBERS CONSISTING OF OR COMPRISING COPOLYAMIDE FROM STICKINESS

Satoshi Ando, Osaka; Yusaku Tanaka, Osaka; Minoru Kojima, Osaka-fu, and Kyoichi Fujimura, Ibaraki City, Osaka-fu, all of Japan, assignors to Kanegafuchi Boseki Kabushiki Kaisha, Tokyo, Japan and Snia Viscosa Societe Nazionale Industria Applicazioni Viscosa S.p.A., Milan, Italy

Division of Ser. No. 601,756, Dec. 14, 1966, abandoned
Filed Aug. 30, 1968, Ser. No. 810,858
No. 810,858
Int. Cl. B29f *3/10*; **D02g** *3/00*
U.S. Cl. 161—173 **3 Claims**



A method for producing nonsticky copolyamide-containing fibers wherein at least one normal paraffin selected from the group consisting of methane series hydrocarbons represented by the formula C_nH_{2n+2}, wherein n is an integer of at least 14, is dispersed homogeneously in a copolyamide melt. The so-melted copolyamide is then extruded through a spinning nozzle simultaneously with a homopolyamide melt.

3,616,183
POLYESTER SHEATH-CORE CONJUGATE FILAMENTS

John Raymond Brayford; Ian Stuart Fisher, and Michael Mundie Robertson, all of Harrogate, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 17, 1969, Ser. No. 807,919
Claims priority, application Great Britain, Mar. 22, 1968, 13988/68
Int. Cl. D01d *5/28*
U.S. Cl. 161—175 **20 Claims**

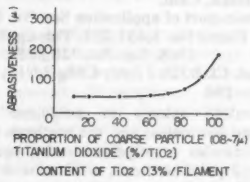
Sheath/core conjugate filaments which combine the tensile properties of poly(ethylene terephthalate) as core with the surface properties of a copolyester of ethylene terephthalate/polyoxyethylene terephthalate as sheath.

3,616,184

TITANIUM DIOXIDE-CONTAINING SYNTHETIC FILAMENT HAVING IMPROVED PROPERTIES, TEXTILE PRODUCTS MADE THEREFROM AND METHOD OF IMPARTING SAID IMPROVED PROPERTIES

Yasushi Katagiri, 1-55-2, Zendana-cho, Mizuho-ku; Teruo Obata, 2-33, Hasho-dori, Mizuho-ku; Masahiko Sugiura, 32, Tahakura-cho, Atsuta-ku, and Ryoichi Yasuda, 1-40, Shigo-cho, Minami-ku, all of Nagoya, Japan

Filed Mar. 12, 1968, Ser. No. 712,447
Int. Cl. D02g 3/02
U.S. Cl. 161—174 7 Claims



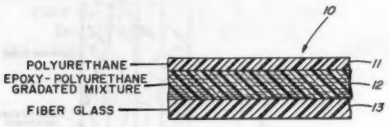
Titanium dioxide-containing synthetic filament having an improved surface properties which contains dispersed throughout its structure in an amount of 0.01–1 percent by weight, based on said filament, titanium dioxide particles consisting essentially of particles not greater than 7 microns in particle diameter, of which 10–70 percent by weight is coarse particle titanium dioxide of 0.8–7 microns in particle diameter, textile products made therefrom and a method of imparting said improved properties.

3,616,185

GLASS FIBER ARTICLES WITH A PROTECTIVE LAYER OF POLYURETHANE AND METHOD OF PREPARATION

Samuel Goldberg, 4056 Nichols Ave. S.W., Washington, D.C.

Continuation-in-part of application Ser. No. 594,590, Nov. 15, 1966, now abandoned. This application June 17, 1970, Ser. No. 47,070
Int. Cl. B32b 17/10, 27/38, 27/40
U.S. Cl. 161—185 2 Claims



A coating to protect exposed glass fabric articles comprising polyurethane. The polyurethane is bonded to the glass fabric by applying a graduated premixture of polyurethane and epoxy resin between the polyurethane and glass fabric.

3,616,186

COPPER-POLY (ARYLENE SULFIDE) LAMINATES AND PROCESS FOR PREPARING SAME

Jennings P. Blackwell, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Sept. 29, 1969, Ser. No. 861,994
Int. Cl. B32b 15/20, 15/08
U.S. Cl. 161—187 9 Claims

Laminate structures of a poly(arylene sulfide) coating composition on a copper substrate are formed by pretreating the copper substrate with a basic nitrogenous compound or salt thereof prior to the coating of the substrate with the poly(arylene sulfide) coating composition.

3,616,187

PACKAGING FOIL

Gerhard Ottmann, and Clemens Lilienbeck, both of Wuppertal-Barmen, Germany, assignors to Kurt Herberts & Co. Vorm. Otto Louis Herberts, Wuppertal-Barmen, Germany

Filed Oct. 4, 1968, Ser. No. 765,040
Claims priority, application Germany, Feb. 29, 1968, H 065441
Int. Cl. B32b 27/30, 27/40
U.S. Cl. 161—189 11 Claims

Packaging foil comprising a flexible support foil, a top layer of a vinyl polymer and an adhesion promoter or primer between the support foil and top layer, wherein the primer is a mixture of a chlorine or fluorine-containing polymer and an organic compound with at least two isocyanate groups.

3,616,188

DRY FRICTION MEMBERS

Raymond Mancel, Paris, France, assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Division of Ser. No. 449,139, Apr. 19, 1965, Pat. No. 3,501,360. Filed Aug. 27, 1969, Ser. No. 870,914
Claims priority, application France, Apr. 17, 1964, 971248
Int. Cl. B32b 3/00, 15/08, 27/04
U.S. Cl. 161—189 4 Claims

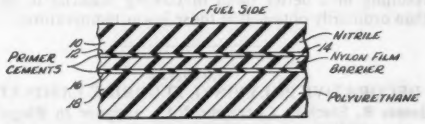
The dry friction member has a friction surface and consists of a metal support having a roughened surface, a graphite tissue impregnated with a copolymer of tetrafluoroethylene and hexafluoropropene which adheres to said roughened surface wherein the graphite tissue is in intimate contact with the roughened surface on one face of said impregnated graphite tissue and presents on the other face a plurality of noncoated areas interspersed with spots of the copolymer.

3,616,189

LIQUID CONTAINER CELLS WITH CURED NITRILE INNER LAYER AND CURED POLYETHER-POLYURETHANE ELASTOMER OUTSIDE LAYER

George B. Harr, Pasadena, Calif., assignor to Firestone Tire & Rubber Company, Akron, Ohio

Continuation-in-part of application Ser. No. 413,763, Nov. 25, 1964, now abandoned, which is a continuation of application Ser. No. 357,499, Apr. 6, 1964, now abandoned. This application Dec. 17, 1968, Ser. No. 787,300
Int. Cl. B32b 27/40, 27/40; A45c 11/00
U.S. Cl. 161—190 7 Claims



Fuel cells are made with cured nitrile rubber on the inner surface and cured polyurethane on the outer surface. A nylon barrier may be provided between the two. The polyurethane layer is preferably prepared by spraying a curing agent and polyurethane precursor through a nozzle which mixes the two.

3,616,190

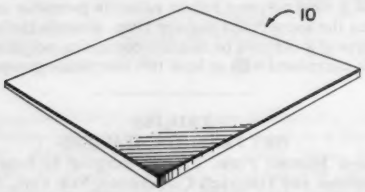
LAMINATED HEAT-SEALABLE SHEET HAVING ALUMINUM ADHERED TO A VINYL-CHLORIDE-COATED REGENERATED CELLULOSE SHEET

Fred B. Shaw, Hinsdale, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Continuation of application Ser. No. 609,453, Jan. 16, 1967, now abandoned. This application Mar. 23, 1970, Ser. No. 20,447

Int. Cl. B32b *15/20, 27/08, 27/40*

U.S. Cl. 161—190 5 Claims



A laminated heat-sealable sheet is constructed of a plurality of plies of flexible films wherein the first ply is aluminum foil, the second ply is a polyolefin resin bonded to one face of the aluminum foil, the third ply is a heat-sealable thermoplastic resin bonded to the other face of the aluminum foil, and the fourth ply is polyvinylchloride-coated regenerated cellulose bonded to the polyolefin ply with a polyurethane resin primer.

3,616,191

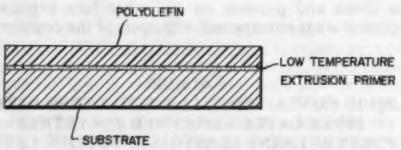
LOW TEMPERATURE EXTRUSION PRIMER

James J. Fuerholzer, Crystal Lake; Neal G. Reddeman, Wauconda, and Samuel Zweig, Skokie, all of Ill., assignors to Morton International, Inc.

Filed Nov. 29, 1967, Ser. No. 686,427

Int. Cl. B32b *27/08, 27/40*

U.S. Cl. 161—190 33 Claims



A method of obtaining improved adhesion of extruded olefin polymer coating materials to packaging material substrates, involving the use of a hydrolyzed copolymer of an olefin and ester of an unsaturated alcohol, e.g., an ethylene-vinyl acetate copolymer, or isocyanate reaction product thereof, as an adhesion improving primer or tie coat which permits extrusion of the coating material onto the primed surface at a lower temperature than ordinarily required, resulting in a better bond of coating material to substrate than ordinarily obtained at those lower temperatures.

3,616,192

DECORATIVE POLYVINYL FLUORIDE LAMINATIONS

James R. Sinclair, Charlotte, N.C., assignor to Riegel Paper Corporation, New York, N.Y.

Continuation-in-part of application Ser. No. 732,258, May 27, 1968, now abandoned , Continuation-in-part of application Ser. No. 484,809, Sept. 3, 1965, now abandoned. This application Feb. 4, 1970, Ser. No. 8,750

Int. Cl. B32b *27/30;* B44f *9/02;* D06n *3/12*

U.S. Cl. 161—184 7 Claims

A printing ink formulation including a blend of a polyester resin and epoxy resin is disclosed for use on polyvinyl fluoride films. The printed polyvinyl fluoride films may be used as the outer layer in laminate structures, where the inert properties of polyvinyl fluoride are desired. In such a laminate structure, the printed surface of the polyvinyl fluoride film is joined to a substrate such as a polyvinyl chloride layer by a laminating adhesive that is based on a polyester resin that is the same as or similar to the polyester resin component of the printing ink formulation.

3,616,193

THERMOSET POLYDIENE RESIN ADHESIVE BONDED LAMINATES AND METHODS OF MAKING SAME

Hyman R. Lubowitz, Redondo Beach, and Eugene A. Burns, Palos Verdes Estate, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Continuation-in-part of application Ser. No. 531,026, Mar. 2, 1966, now Patent No. 3,431,235. This application May 14, 1968, Ser. No. 728,885

Int. Cl. B32b *27/40;* C08g *33/10, 30/00*

U.S. Cl. 161—190 20 Claims

This invention relates to polydiene resin coatings, adhesives, and laminates, and the methods of producing the same. In particular a polydiene resin, such as dihydroxyl terminated 1,2-polybutadiene, is mixed with an organic chain extender, such as 2,4-toluene diisocyanate, in the presence of a peroxide free radical initiator, such as dicumyl peroxide, to form a liquid polymeric mixture. The liquid polymeric mixture is dissolved in a carrier solvent to facilitate application on a surface to be coated or bonded. After removal of the carrier solvent, the liquid polymeric mixture is exposed to ambient or slightly elevated temperatures whereby an elastomeric coating or bond is formed. At a subsequent period of time, the elastomeric material is exposed to elevated temperatures whereupon the elastomer is cured to a hard resinous coating or bond.

3,616,194

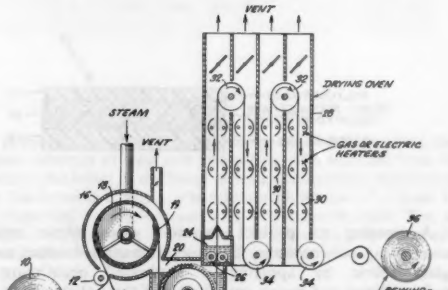
FIBROUS SILICATE PRODUCTS AND METHODS AND APPARATUS FOR THEIR PRODUCTION

William T. Russell, North Manchester, Ind., assignor to Wall-Away Corporation, Wabash, Ind.

Filed Dec. 4, 1968, Ser. No. 781,200

Int. Cl. B32b *13/08*

U.S. Cl. 161—210 8 Claims



New composited fibrous products comprising alkali metal silicates, made from a plurality of layers of a silicated fibrous substrate such as a strong, dense Kraft paper are disclosed. A wide variety of products in the form of panels, tubes, both round and multisided, containers, such as boxes and drawers for furniture, desks and the like, or formed by shaping and forming said layers in the manner of laminating; for example, by heat and pressure in a press, or a combination of press and mandrel. The stock material for the laminating operation contains the silicate in the voids of the paper continuously from surface to surface, as viewed in cross section. The

silicate content is at least one-fourth pound per pound of substrate. The silicated paper stock is produced by techniques which cause the silicate to penetrate the paper in a surface-to-surface manner, and, when laminated, the silicate unifies through all layers.

3,616,195

PRINTED CIRCUIT BOARD HAVING METAL LAYER BONDED TO HYDROCARBON BASE AND METHOD OF MAKING IT

Harold A. Rendleman, Bellwood, and Henry Alsberg, Northbrook, both of Ill., assignors to The Richardson Company, Melrose Park, Ill.

Filed Dec. 26, 1968, Ser. No. 787,280
Int. Cl. B32b *27/32, 25/16, 15/08*
U.S. Cl. 161—215 **10 Claims**

Metal clad products useful for printed circuits and the like are produced with a hydrocarbon base through the use of a two-coat adhesive system wherein each coating contains a combination of a normally thermoplastic, polyvinyl polymer and a thermosetting resin and the coating next to the hydrocarbon base contains a free radical producing catalyst. Multifunctional monomer additives such as triallyl cyanurate have also been found useful. The resultant cured products are characterized by good adhesion and by resistance to hot solder at temperatures in the order of about 500° F.

3,616,196

SHEETS AND LAMINATES OF RESINOUS AND FIBROUS MATERIALS

George C. Sun, Cherry Hill, N.J., and Theodore Shell, Swarthmore, Pa., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 27, 1968, Ser. No. 779,602
Int. Cl. B32b *17/10;* **C08g** *20/32, 51/04*
U.S. Cl. 161—227 **17 Claims**

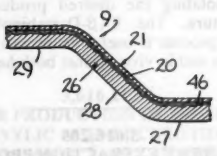
(A) Sheets of fibrous material impregnated with a polymeric precursor of a polyimide resin, that may be partially cured if desired, wherein such polymeric precursor has inert, thermally stable, colloidal particles dispersed therein and (B) unitary polyimide laminates prepared from a plurality of such sheets.

3,616,197

PLASTIC LINED RECEPTACLE OR THE LIKE

Stephen W. Amberg, James, N.Y.; Ralph G. Amberg, Monticello, Ind., and Frank S. Landers, Huntington, N.Y., assignors to Owens-Illinois, Toledo, Ohio

Filed Dec. 10, 1969, Ser. No. 880,486
Int. Cl. B32b *27/10;* **B65d** *5/56*
U.S. Cl. 161—229 **13 Claims**



Molded pulp plate having continuous unseamed liner of polypropylene film bonded to its interior surfaces by pigmented polyamide ink, or a pigmented resin emulsion, which serves as adhesive and also provides all or part of a decorative design visible through the transparent film. Underside of polypropylene film may have further decorative printing of conventional ink, the adhesive being printed or coated thereover. Method includes clamping a sheet of polypropylene film, having the dried resin adhesive on its underside surface, against the smooth rim of the plate; heating the plate and film to a temperature which is above the softening point temperature of the resin constituent of the pigmented coating but below the softening point temperature of polypropylene; and drawing a vacuum through the bottom of the plate to press the film against the interior surfaces of the plate.

3,616,198

PROCESS FOR PRODUCING LAMINATE

Kenji Saito, Fujieda-shi, Japan, assignor to Sumitomo Bakelite Company Limited, Tokyo, Japan

Filed Mar. 21, 1969, Ser. No. 809,203
Claims priority, application Japan, Mar. 26, 1968, 43/19181
Int. Cl. B32b *15/08*
U.S. Cl. 161—216 **11 Claims**

In a process for producing a laminate by assembly of metal plate and thermosetting resin-impregnated sheet by heating under pressure, improvement in that the assembly contains a peroxide and a thermoplastic polymer film being in contact with the inner surface of the metal plate, to insure the firm adhesion of the laminate, and contains additionally another thermoplastic polymer film being in contact with the outer surface of the resin-impregnated sheet during the operation but removed after the operation, to yield a mat laminate having the same excellent properties.

3,616,199

REINFORCING PROCESS

David S. Breslow, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Sept. 30, 1969, Ser. No. 862,520
Int. Cl. B32b *27/06;* **C07c** *143/56*
U.S. Cl. 161—231 **6 Claims**

The addition of fibrous polyester reinforcing material to rubber stock can be improved by treating the fibrous material with a polysulfonyl azide having the formula $R\text{-}(SO_2N_3)_x$ where R is a polyvalent organic radical, such as an aliphatic, cycloaliphatic or aromatic radical and x is an integer greater than 1. Vulcanized rubber tires reinforced with treated polyester tire cord are disclosed.

3,616,200

THERMAL OXIDATIVE DEGRADATION RESISTANT STRUCTURE OF AN AROMATIC POLYMER AND CERTAIN METAL COMPOUNDS

Herbert I. Reibach, Waynesboro, Va., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of application Ser. No. 624,696, Mar. 21, 1967, now abandoned. This application Jan. 19, 1970, Ser. No. 4,070
Int. Cl. C08g *51/56, 51/60, 51/62*
U.S. Cl. 161—225 R **22 Claims**

A shaped structure (e.g., a fiber, molded object, or sheetlike material) of an aromatic, substantially linear, polyamide, polyimide, polyimidazole, polythiadiazole or polyoxadiazole, with the polymer being in contact with a trace amount of chloride ion, and the polymer also being in contact with specified compounds of manganese, zinc, aluminum or bismuth. Such a structure exhibits improved resistance to oxidative degradation when in contact with a copper or iron containing metal at elevated temperatures in air containing traces of water. The structure is particularly useful as insulation for electrical conductors, motors and generators.

3,616,201

EXTENDER FOR THERMOSETTING RESIN

Frank S. Trocino, Eugene, Oreg., assignor to Cascade Fiber Co., Eugene, Oreg.

Filed Oct. 17, 1969, Ser. No. 867,360
Int. Cl. C08g *51/18;* **C08h** *17/18*
U.S. Cl. 161—262 **7 Claims**

Douglas-fir bark is prepared for use as an extender for thermosetting resins by solvent-extracting wax to leave maximum content of 3 percent.

3,616,202

CULTURE OF ANAPLASMA MARGINALE

Donald Wayne Marble, Sparks, Nev., assignor to Research Corporation, New York, N.Y.

Continuation of application Ser. No. 840,047, July 8, 1969, now abandoned. This application June 15, 1970, Ser. No. 48,871
Int. Cl. C12k *1/06*
U.S. Cl. 195—1.8 4 Claims

The organism *Anaplasma marginale* is cultured in rabbit bone marrow tissue culture established in buffered "Medium 199" containing sheep serum with erythrocyte stimulating factor, fetal calf serum and vitamin B-12.

3,616,203

VIRUS CULTURE AND METHOD

Albert Brown, Lincoln, Nebr., assignor to Norden Laboratories, Inc., Lincoln, Nebr.

Division of Ser. No. 647,943, June 22, 1967, abandoned, which is a Continuation-in-part of application Ser. No. 416,906, Dec. 8, 1964, now abandoned , which is a continuation-in-part of application Ser. No. 377,098, June 22, 1964, now abandoned. Filed Dec. 11, 1969, Ser. No. 884,320
Int. Cl. C12k *9/00, 5/00*
U.S. Cl. 195—1.8 5 Claims

Improvement in vaccine preparation whereby an established cell line is tested to determine its suitability for vaccine preparation, the cell line if found to be suitable is frozen to obtain a master cell seed stock, and when desired the master cell seed stock is thawed, tested again for its suitability for use in vaccine preparation, and finally used for that purpose.

3,616,204

METHOD FOR SOIL RESTORATION

Richard R. Linn, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed May 28, 1969, Ser. No. 828,780
Int. Cl. C12b *1/00*
U.S. Cl. 195—2 8 Claims

Soil contaminated by hydrocarbon spillage is restored by first disturbing the soil, as by plowing or discing, followed by inoculating with a hydrocarbon-consuming micro-organism and maintaining an environment controlled as to nutrient and oxygen content.

3,616,205

SOLUBILIZATION OF INSOLUBLE COLLAGEN

Yasuto Ito, Tokyo, and Hisao Kojima, Ichikawa, both of Japan, assignors to Nihon Hikaku Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of application Ser. No. 403,357, Oct. 12, 1964, now abandoned , Continuation-in-part of application Ser. No. 561,730, June 30, 1966, now abandoned , Continuation-in-part of application Ser. No. 624,229, Mar. 20, 1967, now abandoned. This application Feb. 3, 1970, Ser. No. 8394
Int. Cl. C12b
U.S. Cl. 195—6 5 Claims

A method of solubilizing insoluble collagen which comprises treating said insoluble collagen at a temperature of 0° 37° C., at a pH of 1.5 to 3.0 with the collagen solubilizing proteolytic enzyme produced from specific micro-organisms having an optimum activity for solubilizing milk casein at a pH of 2.2 to 2.4.

3,616,206

METHOD FOR THE PRODUCTION OF INOSINE

Ikuo Nogami, Kyoto; Michio Katsumata, Kobe; Akira Imada, Nishinomiya; Makoto Kida, Fuse, and Masahiko Yoneda, Suita, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Sept. 2, 1966, Ser. No. 576,867
Claims priority, application Japan, Sept. 4, 1965, 40/54361
Int. Cl. C12d *13/06*
U.S. Cl. 195—28 N 5 Claims

Method for the production of inosine which comprises inoculating an adenine and amino acid-double requiring mutant such as *Bacillus pumulis* Gottheil No. 3218 (ATCC No. 21005), onto a culture medium containing adenine source and amino acid source, incubating the culture medium until inosine is accumulated and recovering inosine from the culture medium.

3,616,207

METHOD FOR THE PRODUCTION OF 5'-INOSINIC ACID AND INOSINE

Masahiko Yoneda, Suita, and Akira Imada, Nishinomiya, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Dec. 27, 1966, Ser. No. 604,607
Claims priority, application Japan, Dec. 28, 1965, 40/81389
Int. Cl. C12d *13/06*
U.S. Cl. 195—28 N 9 Claims

5'-inosinic acid and/or inosine are(is) produced by incubating adenine-, amino acid- or/and vitamin- double or triple requiring mutants derived from *Bacillus licheniformis*, in a culture medium containing an adenine source and an amino acid source and/or a vitamin source.

3,616,208

FERMENTATION PROCESS FOR 9-(β-D-ARABINOFURANOSYL)ADENINE

John David Howells, Grosse Pointe Woods, and Albert Ryder, Detroit, both of Mich., assignors to Parke, Davis & Company, Detroit, Mich.

Continuation-in-part of application Ser. No. 606,044, Dec. 30, 1966, now abandoned. This application Sept. 29, 1967, Ser. No. 671,557
Int. Cl. C12d *13/06*
U.S. Cl. 195—28 N 5 Claims

Process for the production of 9-(β-D-arabinofuranosyl)adenine by inoculating an aqueous nutrient medium, preferably containing sources of assimilable carbon and nitrogen and added inorganic salt and having a pH between about 6 and 8, with a 9-(β-D-arabinofuranosyl)adenine-producing strain of *Streptomyces antibioticus*, such as the strain corresponding to NRRL 3238, conducting a fermentation under aseptic aerobic conditions at a temperature between about 20° and 45° C. until a substantial quantity of 9-(β-D-arabinofuranosyl)adenine is formed, and isolating the desired product from the fermentation mixture. The 9-(β-D-arabinofuranosyl)adenine product of the process is useful as an antiviral agent that is active in in vitro and in vivo against both herpes and vaccinia viruses.

3,616,209

SOLVENT EXTRACTION PROCESS

Bernard Maurice Laine; Jean Claude Hondermarck, and Robert Goux, all of Lavera, Bouches du Rhone, France, assignors to The British Petroleum Company Limited, London, England

Filed Jan. 24, 1968, Ser. No. 700,017
Claims priority, application Great Britain, Jan. 31, 1967, 4580/67
Int. Cl. C12c *11/00*
U.S. Cl. 195—28 6 Claims

Solvent extraction of a solid material which is contaminated with at least one hydrocarbon and water which comprises, in a first extraction stage consisting of one or more extraction steps, extracting a contaminated solid material with a mixture of an alcohol and a hydrocarbon with which it forms an azeotrope, the alcohol and azeotrope

forming hydrocarbon respectively being employed at a ratio by volume within the range 30:70 to 70:30.

Preferably in a second extraction stage consisting of one or more extraction steps, following the first extraction stage, the treated solid material from the first stage is extracted with a solvent comprising or consisting of the alcohol, thereafter recovering the treated solid material.

Suitably the azeotrope-forming hydrocarbon is normal hexane. Suitably the alcohol is ethanol, propanol, isopropanol or a butanol.

Suitably the process of the invention is applied to a crude or partially refined product of the growth of a micro-organism on a hydrocarbon substrate in the presence of an aqueous nutrient medium.

Preferably the micro-organism is a yeast.

3,616,210

PROCESS FOR PRODUCING L-GLUTAMIC ACID

Katsunobu Tanaka; Kazuo Kimura, and Masaki Yamamoto, all of Machida-shi, Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Apr. 30, 1968, Ser. No. 725,518
Claims priority, application Japan, May 15, 1967, 42/30401
Int. Cl. C12b *1/00*
U.S. Cl. 195—28 **10 Claims**

The present disclosure is directed to a process for producing amino acids such as L-glutamic acid which comprises culturing a gaseous hydrocarbon-assimilating micro-organism capable of producing said amino acid in an aqueous nutrient medium under aerobic conditions and in the presence of gaseous hydrocarbons as the main carbon source and a fermentation enhancer.

3,616,211

PROCESS FOR PRODUCING DEOXYRIBONUCLEIC ACID

Paul A. Pietsch, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 2, 1968, Ser. No. 725,980
Int. Cl. C12d *13/06*
U.S. Cl. 195—28 N **1 Claim**

An antibiotic characterized by the property that it bonds with deoxyribonucleic acid to form an adduct, and represented by phleomycin, is purified by combining the crude material with deoxyribonucleic acid, alone or as nucleohistone in vitro or especially in vivo, to form its specific complex, removing objectionable impurities that do not form such complexes, optionally liberating the antibiotic from the deoxyribonucleic acid complex as by enzymolysis, and separating it from the enzymolyzed fragments.

3,616,212

PROCESS FOR PRODUCTION OF INOSINE AND 5'-GUANYLIC ACID NUCLEOTIDES

Shigeo Abe, Tokyo; Akira Furuya, Machida-shi, and Ryo Okachi, Machida-shi, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Sept. 9, 1968, Ser. No. 758,591
Claims priority, application Japan, Sept. 27, 1967, 42/61679
Int. Cl. C12d *13/06*
U.S. Cl. 195—28 N **15 Claims**

A process for producing inosine and 5'-guanylic acid nucleotides by fermentation which comprises culturing a mutant strain having the ability to accumulate inosine and simultaneously to convert 5'-xanthylic acid into 5'-guanylic acid nucleotides under aerobic conditions in an aqueous nutrient medium containing 5'-xanthylic acid. Strains advantageously employed are *Brevibacterium ammoniagenes* ATCC 21264 and *Corynebacterium glutamicum* ATCC 21266.

3,616,213

PRODUCTION OF α-KETOGLUTARIC ACID BY FERMENTATION OF HYDROCARBONS

Ryuichiro Tsugawa, Tokyo; Takashi Nakase, Kanagawa-ken; Tadao Kobayshi, Kanagawa-ken; Koichi Yamashita, Kanagawa-ken, and Shinji Okumura, Tokyo, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Jan. 15, 1969, Ser. No. 791,502
Claims priority, application Japan, Jan. 24, 1968, 43/4104; Mar. 4, 1968, 43/13938
U.S. Cl. 195—28 **5 Claims**

α-ketoglutaric acid is obtained in good yields by aerobic culturing of certain strains of Candida and Saccharomyces on culture media containing hydrocarbons as principal carbon source. The yield is enhanced by the presence of trace amounts of vitamin B_1, Zn^{++}, Cu^{++}, and/or Fe^{++}.

3,616,214

CULTURE OF MICRO-ORGANISMS ON HYDROCARBONS

Isao Takeda, Iruma-gun, and Takashi Iguchi, Tokyo, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 28, 1969, Ser. No. 819,938
Claims priority, application Japan, May 8, 1968, 43/30263
Int. Cl. C12d *13/06*
U.S. Cl. 195—28 **9 Claims**

A method to produce L-glutamic acid, inosine, and yeast in good yield, at first by adding higher boiling portions of petroleum fractions, paraffin oil, and normal paraffin as the source of hydrocarbons (C_{14}–C_{18}) to the culture medium in which micro-organisms and yeast are cultured, and then by adding lower boiling portions of widely ranged hydrocarbons.

3,616,215

METHOD OF PRODUCING INOSINIC ACID

Hiroshi Sasaki, Kanagawa-ken; Akira Kamimura, Kanagawa-ken; Kazuhiko Yamada, Kanagawa-ken; Teruo Shiro, Kanagawa-ken, and Shinji Okumura, Tokyo, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Continuation-in-part of application Ser. No. 680,329, Nov. 3, 1967, now abandoned. This application Nov. 4, 1969, Ser. No. 874,067
Int. Cl. C12d *13/06*
U.S. Cl. 195—28 N **4 Claims**

Substantial amounts of 5'inosinic acid are formed from adenine when a conventional culture medium containing a source of phosphate ions and adenine is fermented by means of the newly discovered species Arthrobacter nucleogenes.

3,616,216

PRODUCTION, RECOVERY AND APPLICATION OF ENZYMATICALLY ACTIVE MICRO-ORGANISMS

Eugene H. Wegner, Bartlesville, Okla., assignor to Phillips Petroleum Company

Division of Ser. No. 549,472, May 12, 1966, Pat. No. 3,510,401. Filed Nov. 6, 1969, Ser. No. 874,402
Int. Cl. C12d *13/00*
U.S. Cl. 195—28 **2 Claims**

Enzymatically active micro-organisms adapted to the conversion of hydrocarbons by growth in relatively nonvolatile hydrocarbons are substantially freed of such nutrient hydrocarbon by extraction with a relatively volatile hydrocarbon solvent having from 4 to 7 carbon atoms per molecule and residual solvent hydrocarbon is removed by suitable vaporization means without impairing the activity of said micro-organisms.

3,616,217

PROCESS FOR PREPARING L-THREONINE

Kiyoshi Watanabe, 1-21 4-ban, Okihama, Takasago-cho, Takasago, Hyogo; Tutomu Tanaka, Katayama, Maiko-cho, Tarumi-ku, Kobe, Hyogo; Tamotu Hirakawa, 574, Befu-cho, Kakogawa, Hyogo, and Hiroshi Motoki, 1648-8, Fujii, Akashi, Hyogo, all of Japan

Continuation-in-part of application Ser. No. 731,704, May 24, 1968, now abandoned. This application Mar. 18, 1970, Ser. No. 20,823

Claims priority, application Japan, Aug. 4, 1966; Aug. 31, 1966, 41/51266; 41/57005

Int. Cl. C12d *13/00*

U.S. Cl. 195—29 11 Claims

A process for preparing L-threonine by cultivating an artificial mutant of Escherichia coli (ATCC-21248) which requires methionine and valine or leucine in an aqueous nutrient medium under submerged aerobic condition to accumulate appreciable quantities of L-threonine.

3,616,218

METHOD OF PRODUCING L-LYSINE

Isamu Shiio, Tokyo; Konosuke Sano, Nakamori; Miyajima Shigeru, Ryuichi, and Noboru Katsuya, Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Continuation-in-part of application Ser. No. 699,807, Jan. 23, 1968, now abandoned , Continuation of application Ser. No. 658,251, Aug. 3, 1967, now abandoned. This application May 4, 1970, Ser. No. 34,637

Int. Cl. C12b *1/00*

U.S. Cl. 195—29 7 Claims

When strains of Brevibacterium flavum, whose growth in a culture medium is inhibited by addition of excess threonine or methionine, but which may require threonine for their growth, are cultured on an otherwise conventional medium including a proper amount of threonine, a large amount of L-lysine accumulates in the medium.

3,616,219

PROCESS FOR IMPROVED ENZYME CONVERTIBILITY OF STARCH

Henry C. Massey, Decatur, Ill., assignor to A.E. Staley Manufacturing Company, Decatur, Ill.

Division of Ser. No. 777,140, Nov. 19, 1968, abandoned

Filed Mar. 9, 1970, Ser. No. 17,912

Int. Cl. C12d *13/00*

U.S. Cl. 195—31 6 Claims

Process for hydrolyzing starch with alpha-amylase in which aqueous starch hydrolyzable by alpha-amylase, a water-insoluble calcium compound as an alpha-amylase thermostabilizing agent, and an alkali metal orthophosphate buffering agent are combined with an alpha-amylase preparation for a time sufficient to allow hydrolysis of the starch to occur.

3,616,220

METHOD FOR PREPARING LOW D. E. STARCH HYDROLYZATES

Robert E. Nisbet, and Ernest E. Allen, both of Decatur, Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Oct. 30, 1968, Ser. No. 772,042

Int. Cl. C12b *1/00*

U.S. Cl. 195—31 5 Claims

Aqueous starch paste is acid converted to a hydrolyzate having a dextrose equivalent constant (D.E.) in the range of from about 8 to about 16 percent, then after removal of any insoluble fatty material present, the acid hydrolyzate is cooled for at least 1 hour at a temperature below about 60° F., e.g., in the range of from about 32° F. to about 50° F., and precipitated material formed then is separated from the chilled hydrolyzate liquor. The resultant hydrolyzates, as well as hydrolyzates formed by slight alpha-amylase conversion of the resultant liquor, form aqueous syrups having excellent stability against haze formation. The lower D.E. hydrolyzates produced also are essentially nonsweet and nonhygroscopic.

3,616,221

ENZYMA METHOD FOR CONVERTING GLUCOSE IN GLUCOSE SYRUPS TO FRUCTOSE

Yoshiyuki Takasaki, and Osamu Tanabe, both of Chiba-shi, Japan, assignors to The Agency of Industrial Science and Technology, Tokyo, Japan

Continuation-in-part of application Ser. No. 498,980, Oct. 20, 1965, now abandoned. This application Jan. 2, 1969, Ser. No. 805,072

Int. Cl. C12d *1/00*

U.S. Cl. 195—31 13 Claims

Glucose in a glucose syrup is transformed into fructose, in high yields, by reaction with glucose isomerizing enzyme derived from micro-organisms which are characterized as having the ability to assimilate xylan to produce a glucose isomerizing enzyme.

3,616,222

PROCESS FOR SACCHARIFICATION OF CELLULOSIC AND WOODY TISSUES BY FUNGI OR ENZYMES FROM FUNGI

Bruce L. Dasinger, Scotch Plains, N.J., assignor to Esso Research and Engineering Company

Filed May 8, 1969, Ser. No. 823,099

Int. Cl. C12d *13/00*

U.S. Cl. 195—31 10 Claims

In the saccharification of cellulose, mixed cultures or enzymes derived therefrom, are used to increase the rate of converting cellulose to sugar. One culture attacks the cellulose molecule predominantly from the end yielding soluble sugars while other cultures predominantly cleave the cellulose molecules internally at random points yielding shorter fibers but not soluble sugars.

3,616,223

PENICILLIN INTERMEDIATE

Milton Harvey Weiner, 301 Orchard St., Fayetteville, N.Y.

Filed Oct. 31, 1967, Ser. No. 679,557

Int. Cl. C12d *9/06*

U.S. Cl. 195—36 P 8 Claims

A more efficient process for the preparation of 6-amino-penicillanic acid has been devised which employs a penicillin amidase enzyme in the presence of a hydrazide compound. For example, *Streptomyces lavendulae* is employed to hydrolyze enzymatically penicillin V, said hydrolysis being conducted in the presence of a hydrazide such as benzhydrazide to produce superior yields of 6-aminopenicillanic acid from concentrations of penicillin in the range of 2 to 15 percent.

3,616,224

PRODUCTION OF AMINO ACIDS BY FERMENTATION

Isamu Shiio, Kamakura; Shinichiro Otsuka, Yokohama; Shogo Kurasawa, Kawasaki, and Ryosuke Uchio, Yokohama, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed July 31, 1968, Ser. No. 748,970

Claims priority, application Japan, Aug. 5, 1967, 42/50233

Int. Cl. C12d *13/06*

U.S. Cl. 195—49 2 Claims

Two species of bacteria, *Achromobacter methanolophila* and *Pseudomonas insueta*, produce various amino acids in culture media containing methanol as the principal carbon source.

3,616,225

PROCESS FOR PRODUCING UNSATURATED STEROIDS

Masao Isono, Nishinomiya; Takeshi Takahashi, Suita, Osaka; Yoshio Yamasaki, Takarazuka, and Takuichi Miki, Amagasaki, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed May 21, 1968, Ser. No. 730,939
Claims priority, application Japan, May 22, 1967, 42/32755
Int. Cl. C07c *67/00*
U.S. Cl. 195—51 R 8 Claims

Compounds having a 13β-carbon-substituted-8,14-secogona-1,3,5(10),9(11)-tetraene-14,17-dione nucleus are reduced to the corresponding compound having a 13β-carbon-substituted-17α-hydroxy-8,14-secogona-1,3,5(10),9(11)-tetraene-14-one nucleus by the action of a yeast or a culture thereof. Yeasts of the genus Saccharomyces are advantageously used for this purpose.

3,616,226

PROCESS FOR PRODUCING UNSATURATED STEROIDS

Masao Isono, Nishinomiya; Takeshi Takahashi, Suita; Yoshio Yamasaki, Takarazuka, and Takuichi Miki, Amagasaki, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed July 23, 1968, Ser. No. 746,882
Claims priority, application Japan, July 24, 1967, 42/47559
Int. Cl. C07c *167/00*
U.S. Cl. 195—51 R 4 Claims

An optically active compound having a 13β-carbon-substituted-17-hydroxy-8,14-secogona-1,3,5(10),9(11),15-pentaen-14-one nucleus is produced from a compound having a 13β-carbon-substituted-8,14-secogona-1,3,5(10),9(11),15-pentaene-14,17-dione nucleus by the action on the latter of the redox-enzyme system obtained by culturing a Candida, Debaryomyces, Kloeckera, Pichia, Rhodotorula, Schizosaccharomyces or Hansenula micro-organism.

3,616,227

SYNTHESIS OF STEROIDS

Samuel C. Pan, 28 Beacon Hill Drive, Metuchen, N.J., and Leonard J. Lerner, 105 Chester Circle, New Brunswick, N.J.

Division of Ser. No. 631,854, Apr. 19, 1967, Pat. No. 3,451,995.
Filed Sept. 16, 1968, Ser. No. 798,217
Int. Cl. C07c *167/00*
U.S. Cl. 195—51 4 Claims

This invention relates to α-glucosides of steroids containing hydroxy groups in both the 16α- and 17-positions and the method for preparing them by reacting with a polysaccharide or an oligosaccharide, such as maltose, in the presence of a source of the enzyme: amylase or transglucosylase. The α-glucosides are new compounds that possess estrogenic activity. They may be used, therefore, as antifertility agents.

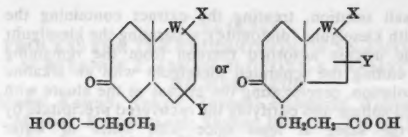
3,616,228

β-SUBSTITUTED PROPIONIC ACIDS AND METHOD OF MAKING THE SAME

Kurt Schubert, Hermann-Lons-Strasse 52; Karl-Heinz Adand Bohme, Georg-Schumann-Strasse 14, and CLare Horhold, Strasse des. 8 Mai 20, all of 69 Jena, Germany

Filed Mar. 12, 1969, Ser. No. 806,714
Int. Cl. C12d *1/02*
U.S. Cl. 195—51 8 Claims

A β-substituted propionic acid of the general formula



wherein W is CH_2, O or NH and wherein X and Y may be the same or different and are H, OH, =O, OAc, lower alkyl, hydroxy- or oxo- substituted lower alkyl, and wherein X and Y may be interconnected.

The acids are made by dissolving 3-keto-steroids in an organic water-soluble solvent and fermenting it with an aerobic culture of Nocardia SPEC and recovering the product from the fermentation medium.

3,616,229

POLYMER-ENZYME PRODUCTS COMPRISING PLURALITY OF ENZYMES COVALENTLY BOUND TO POLYMER

Bernard S. Wildi, Kirkwood; Ernest G. Jaworski, Olivette, and Thomas L. Westman, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Sept. 27, 1968, Ser. No. 763,370
Int. Cl. C12k *1/00*
U.S. Cl. 195—63 19 Claims

Polymer-enzyme products comprising a plurality of enzymes covalently bound to the polymer chain, the plurality of enzymes in any case including one or a plurality of proteases, preferably both a neutral protease and an alkaline protease, and optimally also a third enzyme, e.g., amylase. The products have improved stability and applicability over a wide range due to their increased range of enzymatic activity. They are either water-soluble or water-insoluble and in either case substantially odorless and colorless, long-acting and, in this covalently-bound polymeric state, not subject to the usual disadvantage of autogenous deterioration characteristic of simple enzyme mixtures.

3,616,230

METHOD FOR PRODUCTION OF L-ASPARAGINASE

Joseph Roberts, and Joseph M. Hill, both of Dallas, Tex., assignors to J.K. Wadley and Susie L. Research Institute and Blood Bank, Dallas, Tex.

Filed June 7, 1968, Ser. No. 735,196
Int. Cl. C12d *13/10*
U.S. Cl. 195—66 A 11 Claims

A method of producing L-Asparaginase from a microbial organism, such as Escherichia coli, which encompasses the use of a nutrient medium for growth of the microbial organism which contains a substantial amount of free L-threonine or lactic acid and free amino acids, and in particular free L-glutamic acid and L-methionine. A preferred nutrient medium which contains the above constituents in a substantial amount is a diluted corn steep liquor which has preferably been adjusted to a pH of about 7, centrifuged or filtered and autoclaved before inoculation with the microbial organism.

3,616,231

PROCESS FOR THE PRODUCTION OF URICASE

Hans Ulrich Bergmeyer; Waldemar Thum, and Hans Mollering, all of Tutzing, Germany, assignors to Boehringer Mannheim GmbH

Filed Nov. 14, 1968, Ser. No. 775,946
Int. Cl. C07g *7/026*
U.S. Cl. 195—66 15 Claims

Process for isolating uricase from animal tissue such as liver, kidney and spleen comprising extracting the water-insoluble fraction of such a tissue homogenate with an

alkaline salt solution, treating the extract containing the uricase with kieselguhr (diatomite), separating the kieselguhr having the uricase adsorbed thereon from the remaining solution, eluting the separated kieselguhr with an alkaline acetone solution, precipitating the uricase in the eluate with ammonium sulfate and purifying the recovered precipitate by washing the same at least once with water or water containing a minor amount of a salt.

3,616,232

PURIFICATION AND FRACTIONATION OF ENZYME MIXTURE FROM AQUEOUS SOLUTION

Richard G. Anderson, Ferguson, and Leonard Keay, Florissant, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 14, 1968, Ser. No. 752,458
Int. Cl. C07g 7/028
U.S. Cl. 195—66 R **16 Claims**

Water-clear enzyme solution containing enzyme, e.g., protease and/or amylase, for example, a clarified beer from *B. subtilis* micro-organism production of enzymes or redissolved and clarified enzyme mixture, is treated with solvent to remove polysaccharides and undesirable colored materials. Amylase fraction when present can be separated from protease fraction and both fractions recovered with facility by employment of water-miscible solvent, in which enzymes are not soluble, solvent being used in particular proportion of volume to volume of starting enzyme-containing solution, depending on separation or fractionation desired, and preferably with slow addition of cold solvent to cold solution with vigorous agitation of solution during addition. Allows precipitation of amylase and/or precipitation of protease, or precipitation of both with fractionation thereof into amylase-rich and protease-rich fractions, and even fractionation of proteases, with polysaccharide fraction and colored material remaining in supernatant. High recoveries and purity are attained.

3,616,233

REMOVING ESTERASE FROM MICROBIAL RENNIN

Hans Schleich, Staten Island, N.Y., assignor to Baxter Laboratories, Inc., Morton Grove, Ill.

Filed Feb. 19, 1969, Ser. No. 800,696
Int. Cl. C07g 7/02
U.S. Cl. 195—66 **13 Claims**

Esterase is removed from microbial rennin by acidifying the rennin to a pH of about 2.0 to 3.5 and maintaining the rennin at a temperature of about 20° C. to 55° C. until the esterase is decomposed. Thereafter, the rennin is preferably neutralized to a pH of at least about 4 to inhibit its decomposition.

3,616,234

METHOD OF PREPARING PROTEASE FROM CANDIDA LIPOLYTICA

Kazuo Komagata, Tokyo; Takashi Nakase, Kanagawa-ken; Koji Mitsugi, Kanagawa-ken, and Shinji Okumura, Kanagawa-ken, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Continuation-in-part of application Ser. No. 554,996, June 3, 1966, now abandoned. This application Aug. 11, 1969, Ser. No. 849,137
Int. Cl. C12d 13/10
U.S. Cl. 195—66 R **7 Claims**

Candida lipolytica produces a protease intracellularly and particularly in a culture medium on which the micro-organism is grown. The enzyme may be recovered from the medium by conventional methods or the cell free medium may be contacted with the protein to be hydrolyzed. Alternatively, the protein may be contacted with live cells of the micro-organism in an aqueous medium.

3,616,235

PROCESS FOR PRECIPITATING ENZYMES AND ENZYMATIC INACTIVE PROTEINS IN SOLUTION WITH SYNTHETIC TANNING MATERIALS

Dietmar Schoepfel, Berlin, and Johann Huber, Eichwalde, both of Germany, assignors to Forschungsinstitut fur die Garungsindustrie, Enzymologie und technische Mikrobiologie, Berlin, Germany

Filed May 16, 1968, Ser. No. 729,514
Int. Cl. C07g 7/02
U.S. Cl. 195—68 **2 Claims**

A process for making dry preparations of enzymes or proteins with low-salt content is characterized by precipitating albumen-containing culture solutions or culture filtrates with anionic, cationic or amphoteric-tanning materials and in that the following extraction of inorganic salts and tanning materials takes place with water or mixtures of water and organic solvents, particularly with mono- and/or polyvalent alcohols and ketones, glycol ethers, dioxanes and tetrahydrofurans mixable with water.

3,616,236

PRODUCTION OF RHIZOBIUM STRAINS RESISTANT TO DRYING

Per Staffan Delin, Sodertalje, Sweden, assignor to Aktiebolaget Astra, Sodertalje, Sweden

Filed June 24, 1968, Ser. No. 739,217
Int. Cl. C12k 1/02
U.S. Cl. 195—79 **9 Claims**

The production of Rhizobium strains having good infecting and nitrogen-fixing characteristics by cultivating the strain, then subjecting it to drying whereby those strains which are sensitive to drying are destroyed and those strains which are resistant to drying survive. The surviving strains are then recultivated and subjected to at least one more drying treatment.

3,616,237

METHOD OF PREPARING THIOGRISEOFULVINS

Howard Newman, Monsey, N.Y.; Ping Shu, Pomona, N.Y., and William W. Andres, Lindenhurst, Ill., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 741,256, July 1, 1968, Pat. No. 3,432,714. Filed June 8, 1970, Ser. No. 44,633
Int. Cl. C12d 9/00
U.S. Cl. 195—80 **7 Claims**

The compounds, (+)-1-thiogriseofulvin and (+)-5'-hydroxy-1-thiogriseofulvin, are prepared by cultivation of *Streptomyces cinereocrocatus* under controlled aerobic conditions with substrate dehydro-1-thiogriseofulvin. The compounds have antifungal activity.

3,616,238

METHOD OF PREPARING (+)-5'-HYDROXYGRISEOFULVIN

William W. Andres, Lindenhurst, Ill., and Martin Paul Kunstmann, Pearl River, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 735,987, June 11, 1968, Pat. No. 3,557,151. Filed June 29, 1970, Ser. No. 51,016
Int. Cl. C12d 9/00
U.S. Cl. 195—80 **8 Claims**

The compound(+)-5'-hydroxygriseofulvin is produced by fermentation from dehydrogriseofulvin or (+)-griseofulvin using the micro-organism *Streptomyces cinereocrocatus*. The compound (+)-5'-hydroxygriseofulvin is an antifungal agent.

3,616,239
7-CHLORO-6-DEMETHYL-TETRACYCLINE FERMENTATION
John Andrew Growich, Jr., New City, N.Y., assignor to American Cyanamid Company, Stamford, Conn.
Continuation of application Ser. No. 508,331, Nov. 17, 1965, now abandoned. This application Oct. 12, 1966, Ser. No. 594,958
Int. Cl. C12d 9/00
U.S. Cl. 195—80 **2 Claims**

This disclosure describes a process for the production of 7-chloro-6-demethyltetracycline by fermentative biosynthesis using strains of *Streptomyces aureofaciens* which impart a color to their whole harvest mashes such that a positive value of ΔR is obtained when the values of the percent reflectance of a 1:200 aqueous dilution of the whole harvest mash at 460 mμ, 540 mμ, 560 mμ and 660 mμ are inserted in the following formula:

$$\Delta R = R_{540} + R_{560} - 1.1R_{460} - 0.9R_{660} - 2.0 -.$$

3,616,240
7-CHLORO-6-DEMETHYL-TETRACYCLINE FERMENTATION
John Andrew Growich, Jr., New City, N.Y., assignor to American Cyanamid Company, Stamford, Conn.
Continuation-in-part of application Ser. No. 508,356, Nov. 17, 1965, now abandoned. This application Oct. 12, 1966, Ser. No. 601,250
Int. Cl. C12d 9/00
U.S. Cl. 195—80 **2 Claims**

This disclosure describes a process for the production of 7-chloro-6-demethyltetracycline to the exclusion of 6-demethyltetracycline by fermentative biosynthesis using strains of *Streptomyces aureofaciens* which are characterized by their ability to impart to a 1:200 aqueous dilution of the whole harvest mash a color characterized by a spectrophotometric reflectance curve such that when the percent reflectance is plotted linearly against the wavelength the resulting curve, between 460 mμ and 520 mμ, will either exhibit a maximum or have a point of inflection of zero slope.

3,616,241
PROCESS FOR THE PRODUCTION OF 7-CHLORO-5^a,11^a-DEHYDROTETRACYCLINE
John Andrew Growich, Jr., New City, N.Y., assignor to American Cyanamid Company, Stamford, Conn.
Filed Feb. 15, 1967, Ser. No. 616,167
Int. Cl. C12d 9/00
U.S. Cl. 195—80 **3 Claims**

This disclosure describes a process of producing 7-chloro-5a,11a-dehydrotetracycline which comprises cultivating, under submerged aerobic conditions, strains of *Streptomyces aureofaciens* which are not riboflavin-deficient and are nonresponsive to Cosynthetic Factor-1, and which produce 7-chloro-5a,11a-dehydrotetracycline to the exclusion of tetracycline and 7-chlorotetracycline.

3,616,242
HYDROLYSIS PROCESS FOR THE PREPARATION OF RUBIDOMYCIN
Andre Belloc, Hauts-de-Seine; Yvan Charpentie, Paris; Jean Lunel, Paris, and Jean Preud'Homme, Paris, all of France, assignors to Rhone-Poulenc S.A., Paris, France
Filed Mar. 8, 1968, Ser. No. 711,495
Claims priority, application France, Mar. 15, 1967, 98967
Int. Cl. C12d 9/00
U.S. Cl. 195—80 **9 Claims**

The antibiotic rubidomycin, otherwise known as "13,057 R.P.," is obtained by subjecting the antibiotic 13,213 R.P. to acid hydrolysis at a temperature between 10° and 75° C. for a length of time of from 48 hours to 30 minutes, the length of time varying inversely with the temperature.

Rubidomycin and 13,213 R.P. are both described in British Pat. No. 985,598.

3,616,243
PROCESS FOR THE PRODUCTION OF AN ANTIBIOTIC SUBSTANCE 2'-AMINO-2'-DEOXY-KANAMYCIN IN HIGHER YIELD
Shohei Kawaji, Tokyo; Toyoaki Kawasaki, Tokyo; Masao Murase, Kawasaki-shi; Shunzo Fukatsu, Tokyo; Masahiro Abe, Kawasaki-shi; Yoshihisa Koaze, Tokyo; Tatsuo Ito, Yokohama-shi; Mamoru Suzuki, Yokohama-shi; Masahiro Ueda, Kawasaki-shi, and Hamao Umezawa, Tokyo, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan
Filed Aug. 9, 1968, Ser. No. 751,478
Int. Cl. C12d 9/00
U.S. Cl. 195—80 **1 Claim**

This invention relates to processes for the production of an antibiotic substance 2'-amino-2'-deoxy-kanamycin in higher yield. More particularly, this invention relates to the processes for the production of 2'-amino-2'-deoxy-kanamycin by fermentation using mutants of *Streptomyces kanamyceticus* identified as ATCC21259, ATCC21260, ATCC21161 and ATCC21268.

3,616,244
PRODUCTION OF LINCOMYCIN SULFOXIDE
Alexander D. Argoudelis, and Donald J. Mason, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.
Filed Oct. 21, 1968, Ser. No. 769,395
Int. Cl. C12d 9/00
U.S. Cl. 195—80 **6 Claims**

A microbiological process for the oxygenation of lincomycins to obtain the corresponding lincomycin sulfoxides which are known active antibacterial agents.

3,616,245
IMPROVED FERMENTATION PROCESSES FOR PRODUCING (−)(CIS-1,2-EPOXYPROPYL)-PHOSPHONIC ACID
Edward O. Stapley, Metuchen; Marion Jackson, Cranford, and Jerome Birnbaum, Morganville, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.
Filed Jan. 30, 1969, Ser. No. 795,348
Int. Cl. C12d 9/00
U.S. Cl. 195—80 **4 Claims**

Increased yields of the antibiotic (−)(cis-1,2-epoxypropyl)-phosphonic acid are obtained by the addition of certain carboxylic acids to fermentation media. The antibiotic which is produced by growing newly found strains of Streptomyces on suitable fermentation media is active against both gram-positive and gram-negative bacteria.

3,616,246
USE OF ABSORPTIVE MATERIALS FOR THE PRODUCTION OF FUNGUS SPORES
Edward Cherry, Frederick, Md., assignor to The United States of America as represented by the Secretary of the Army
Filed Aug. 24, 1964, Ser. No. 392,374
Int. Cl. C12b 1/00
U.S. Cl. 195—81 **3 Claims**

1. In a process for the production of fungus spores comprising; inoculating a medium with fungus spores, aerobically incubating the inoculated medium until a maximum amount of fungal mycelia are produced, the improvement comprising recovery of said mycelia from said medium, and placing of a layer of said mycelia upon a moistened absorptive surface, incubating at a temperature of about 25° to 30° C. and at a relative humidity of about 90 to 98 percent for a period of 1 to 4 days to achieve maximum sporulation, drying the spore containing substrate, and recovering said spores therefrom.

3,616,247
PRODUCTION OF GRISEOFULVIN
Harold George Hemming, Manchester; Malcolm Lehan, Sandbach; David Giles, deceased, late of Alderley Edge, and Anne Sylvia Giles, sole administrator, Newbury, all of England, assignors to Imperial Chemical Industries Limited, London, England
Filed Nov. 4, 1968, Ser. No. 773,981
Claims priority, application Great Britain, Dec. 13, 1967, 56,618/67
Int. Cl. C12d *9/00*
U.S. Cl. 195—81 **3 Claims**

A process for the manufacture of griseofulvin, a known antifungal agent, by fermentation of *Khuskia oryzae* and related organisms.

3,616,248
PROCESS FOR THE SEPARATION OF YEAST FROM YEAST-OIL-WATER EMULSIONS
Ulrich Behrens, Leipzig; Manfred Ringpfeil, Holzhausen; Anton Gabert; Dieter Pohland; Karl Sattler, Leipzig; Manfred Rudel, Markkleeberg, Germany; Vladimir Munk, and Jiri Jiricka, Prague, Czechoslovakia, assignors to Deutsche Akademie der Wissenschaften zu Berlin, Berlin, Germany
Filed Jan. 4, 1968, Ser. No. 695,552
Int. Cl. C12c *11/24*
U.S. Cl. 195—82 **14 Claims**

The yeasts in yeast-oil-water emulsions formed in the conversion of hydrocarbons to yeast are separated from the emulsion by adding one of the following two-component combinations of surface-active agents to the emulsion prior to the separation step:

1. polyphenolethyleneoxide-adduct (containing about 16 mols of ethyleneoxide per mol of polyphenol) and oleinmonoethanolamide
2. polyphenolethyleneoxide-adduct and distillation-residue of the fatty acid distillation C_{12} to C_{18}
3. polyphenolethyleneoxide-adduct and hydroxyethylated sulfated fatty alcohol having a chain length between C_{12} and C_{18}
4. alkylmonosulfonate (mean chain length of about C_{15}) and laurylamidoethylpyridiniumchloride
5. alkylmonosulfonate (mean chain length of about C_{15}) and the methosulfate of a quarternary fatty amine having a mean chain length of between C_{15} and C_{17}.

The surface-active agents are used in an amount up to 1.5%/00, preferably below 1%/00, relative to the total emulsion.

3,616,249
PROCESS FOR GROWING YEAST ON HYDROCARBONS
John J. Cavallo, Anaheim, and Paul Richard Hines, Yorba Linda, both of Calif., assignors to Atlantic Richfield Company, Philadelphia, Pa.
Filed June 26, 1968, Ser. No. 740,088
Int. Cl. C12c *11/00*
U.S. Cl. 195—82 **2 Claims**

A process for improving the rate of growth and protein content of *Candida intermedia* grown on normal alkanes by providing a nutrient solution containing from about 8,000 to about 10,000 micrograms of zinc, as a soluble zinc salt, per liter of nutrient is disclosed.

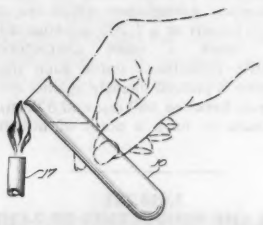
3,616,250
PREFERENTIAL ENZYMATIC LYSIS OF VEGETATIVE CELLS IN PRESENCE OF SPORULATED BACTERIAL CELLS
George R. Hrubant, and Robert A. Rhodes, both of Peoria, Ill., assignors to The United States of America as represented by the Secretary of Agriculture
Filed Oct. 22, 1968, Ser. No. 769,701
Int. Cl. C12d *13/10*
U.S. Cl. 195—96 **1 Claim**

A novel extracellular enzyme complex precipitated from cultures of Bacillus NRRL B–3425 at critical concentrations selectively destroys the vegetative but not the sporulated cells of *Bacillus popilliae* or other spore-forming bacteria, thus providing a means for isolating laboratory-grown *B. popilliae* spores required for studying the apparently limited infectivity of the spores produced in vitro as compared with spores from diseased Japanese beetle larvae.

3,616,251
TEST DEVICE
Gianni Linoli, Lecco, and Enzo Sergio Mannucci, Calolziocorte, both of Italy, assignors to Miles Laboratories, Inc., Elkhart, Ind.
Filed Nov. 8, 1968, Ser. No. 774,490
Int. Cl. G01n *31/14, 31/22*
U.S. Cl. 195—99 **8 Claims**

A test device useful for the detection of a component of a fluid system comprises a water-resistant carrier, such as an organoplastic strip, containing, as an integral part thereof, a test system for the detection of such component. This test device is produced by incorporating the test system into at least a partially dissolved portion of the carrier material and then solidifying such carrier material with the test system included therein.

3,616,252
SEALED STERILE PACKAGE AND PROCESS FOR OPENING SAME
Sheldon H. Forel, Redondo Beach, Calif., assignor to Baxter Laboratories, Inc., Morton Grove, Ill.
Filed Aug. 30, 1968, Ser. No. 756,614
Int. Cl. C12b *3/00*
U.S. Cl. 195—102 **7 Claims**



The contents of a container are therein aseptically sealed by a heat-wastable closure secured in a small container opening. Access to the contents is achieved by passing the sealed portion of the container through a flame, simultaneously to waste said closure for unsealing said container and to sterilize the container about said opening.

3,616,253
METHOD FOR DETERMINING BACTERIAL POPULATIONS
Anthony J. D'Eustachio, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed May 1, 1967, Ser. No. 635,109
Int. Cl. C12k *1/00*
U.S. Cl. 195—103.5 **9 Claims**

A method for determining the population density of bacterial cells in an environment comprising, 1. separating substantially all nonbacterial cells from an aqueous sample of the environment, for example, by low force centrifugation, 2. separating substantially all bacterial cells from the sample, e.g., by filtration, 3. extracting adenosine triphosphate (hereinafter referred to as ATP) from the bacterial cells, 4. measuring the quantity of ATP present, such as, by reacting the ATP with luciferin and luciferase and measuring the light emitted, and 5. determining the number of bacterial cells in the sample, preferably, by dividing the quantity of ATP, in micrograms, by the average ATP/per cell which was found to be about 5×10^{-10} micrograms.

3,616,254

SCREENING PROCEDURE FOR ENZYME DEFICIENCIES

Ernest Beutler, 1501 Highland Oaks, Arcadia, Calif.

Filed May 8, 1967, Ser. No. 641,733
Int. Cl. G01n 31/14
U.S. Cl. 195—103.5 12 Claims

This screening method detects enzyme deficiencies in red blood cells by use of a reaction mixture containing a pyridine nucleotide, the reduced form of which fluoresces upon activation by long wave ultraviolet light but not the oxidized form, thereby detecting the presence or absence of enzyme deficiencies.

3,616,255

METHOD AND DEHYDRATED MEDIUM PERMITTING EASY DETECTION OF BEER LACTIC ACID BACTERIA

Atsushi Nakagawa, Tokyo, Japan, assignor to Asahi Breweries Ltd., Tokyo, Japan

Filed Sept. 14, 1967, Ser. No. 667,673
Claims priority, application Japan, Sept. 21, 1966, 41/61956
Int. Cl. C12k 1/06
U.S. Cl. 195—103.5 6 Claims

A dehydrated medium for permitting easy detection of beer lactic acid bacteria, which medium is prepared by adding a small amount of acetates and mevalonic acid to a dehydrated nutritional medium whose principal components consist of nitrogen source, carbon source, inorganic salts, growth factors for beer lactic acid bacteria and a small amount of agar.

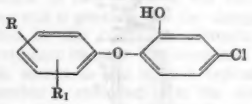
3,616,256

METHOD FOR THE DETERMINATION OF PSEUDOMONAS IN BIOLOGICAL MEDIA

Thomas E. Furia, Hartsdale, N.Y., assignor to Geigy Chemical Corporation, Ardsley, N.Y.

Filed Mar. 18, 1968, Ser. No. 714,089
Int. Cl. C12k 1/06
U.S. Cl. 195—103.5 8 Claims

The presence of Pseudomonas in biological media containing other micro-organisms is determined by adding to the media from 100 to about 800 parts per million of a compound of the formula:



wherein R is halogen and R_1 is hydrogen or chloro.

The medium is then maintained at 20° to 40° C. for an incubation period of 12 hours to 14 days. A particularly preferred compound useful in this method is 2,4,4′-trichloro-2′-hydroxydiphenyl ether.

3,616,257

REAGENT FOR ASSAYING THYROMIMETRIC COMPOUNDS

Clemens J. Ackerman, 1500 Spring Garden St., Philadelphia, Pa.

Filed May 15, 1968, Ser. No. 729,240
Int. Cl. G01n 31/14
U.S. Cl. 195—103.5 3 Claims

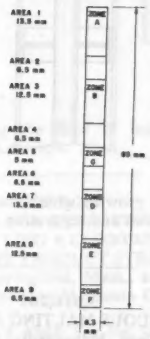
Thyromimetric compounds are assayed by determining the decrease in conversion of inosine-5′-monophosphate to xanthine-5′-phosphate by inosine-5′-monophosphate dehydrogenase. The rate of conversion is measured by absorption of $NADH_2$ at 340 mμ.

3,616,258

DIAGNOSTIC PRODUCT AND PROCESS FOR THE DETECTION OF NIACIN PRODUCTION BY MYCOBACTERIA

Donald P. Kronish, Rockaway, and William D. Young, Jr., Montclair, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed June 18, 1969, Ser. No. 834,424
Int. Cl. C12k 1/06
U.S. Cl. 195—103.5 R 11 Claims



A diagnostic product for the detection of niacin produced by "human" *Mycobacterium tuberculosis* is prepared by impregnating a plurality of individual but separated zones on a paper strip with a series of reagents which include (1) an alkali metal salt of p-aminobenzoic acid; (2) sodium or potassium thiocyanate; (3) a crystalline acid such as citric, oxalic or malonic; and (4) chloramine-T. The desired diagnostic test employing the impregnated paper strip is performed by bringing the strip into contact and in a sealed test tube with an extract of the culture to be tested. If niacin is present the reaction of the several reagents with the niacin leads to color formation as a positive test for the presence of niacin.

3,616,259

SCREENING PROCEDURE FOR ENZYME DEFICIENCIES

Ernest Beutler, 1501 Highland Oaks, Arcadia, Calif.

Division of Ser. No. 641,733, May 8, 1967.
Filed Oct. 6, 1969, Ser. No. 870,395
Int. Cl. G01n 31/14
U.S. Cl. 195—103.5 8 Claims

This screening method detects enzyme deficiencies in red blood cells by use of a reaction mixture containing a pyridine nucleotide, the reduced form of which fluoresces upon activation by longwave ultraviolet light but not the oxidized form, thereby detecting the presence or absence of enzyme deficiencies.

3,616,260

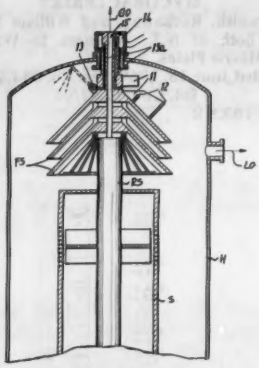
FERMENTATION PROCESS AND APPARATUS

Hans Muller, Erlenbach/Zurich, Switzerland, assignor to Process Engineering Company, S.A., Mannedorf/Zurich, Switzerland

Filed Feb. 20, 1969, Ser. No. 801,095
Int. Cl. C12b 1/18
U.S. Cl. 195—107 6 Claims

In a fermentation process substances are fermented in a container under simultaneous agitation with attendant formation of foam. The foam is separated into its liquid and gaseous phases and the gaseous phase is exhausted. A flowable medium is introduced into the container and into

the region wherein foam forms, in counterflow to the exhausting gaseous phase, to thereby prevent the development of mycelium growths which could lead to interruption of the foam formation and separation.



3,616,261

CONTINUOUS MALTING APPARATUS

Gerhard Leue; Klaus Marquardt; Arndt Lippmann, and Burkhard Jaekel, all of Berlin, Germany, assignors to Forschungsinstitut fur die Garungsindustrie Enzymologie und technische Mikrobiologie, Berlin, Germany

Filed May 22, 1968, Ser. No. 731,110
Int. Cl. C12b *1/02*
U.S. Cl. 195—128 **6 Claims**

An apparatus for automatically operating and regulating a continuous malting process is characterized in that the goods to be malted are continuously guided through a continuously operating malting plant with a constant drop weight, the drop weight being regulated to a predetermined value by a volume-dosing device, the predetermined value being that of the completely filled container and preferably amounting to 1,200 kg./hour, whereupon in the wash section the actual temperatures of water introduced consecutively into a postwash, prewash and steeping vessel as well as the temperature of the lye in the lye wash are regulated to a preset temperature ranging between 8° and 35° C. and the concentration of the lye is regulated to a preset value of 0.1 to 1 percent, while in the soft-washing range, the measured temperatures of the moist goods are regulated to a preset temperature of about 14° C. and during germinating to a preset value of 18° to 20° C., while the water content in this section which determines the degree of softness of the goods is regulated to a preset value of 41 to 45 percent, whereupon in a curing section preferably divided into four zones the temperatures of dry air in the zones prior to their contact with the goods are set to 45°, 65°, 80° and 84° C., respectively, while the moisture contents in the last third of the zones are set to 20–22 percent, 10–12 percent, 6 percent and 4 percent.

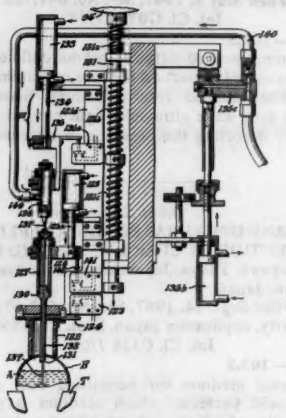
3,616,262

APPARATUS AND METHOD FOR PROPAGATING VIRUSES I IN THE EXTRA-EMBRYONIC FLUIDS OF EGGS

Michael G. Coady, Broomall, and Amherst Carleton Haliday Macartney, Hatfield, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of application Ser. No. 295,409, July 7, 1963, now abandoned. This application June 9, 1967, Ser. No. 645,062
Int. Cl. C12b *1/00, 1/02;* C12k *7/00*
U.S. Cl. 195—12 **20 Claims**

There is disclosed an apparatus and a system for automating the handling of eggs in the various steps of virus production in eggs containing a living embryo. Manual handling of individual eggs is avoided by keeping the eggs in trays, and eight eggs are automatically processed at one time in candling, sterilizing, hole punching, inoculating and sealing the eggs prior to incubation. After incubation the eggs are similarly handled and processed, eight at a time, in candling, chopping off the tops of the eggs, harvesting the extra-embryonic fluids from the eggs, and finally discarding the remainder of eggs.

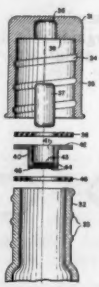


3,616,263

GAS CAP FOR CULTURE TUBES

Ernest J. Anandam, Knoxville, Tenn., assignor to The University of Tennessee Research Corporation, Knoxville, Tenn.

Filed June 16, 1969, Ser. No. 833,491
Int. Cl. C12b *1/00*
U.S. Cl. 195—127 **9 Claims**



A cap for culture tubes for tubercle bacilli and other capnophilic micro-organisms and a modification thereof for anaerobic micro-organisms comprising a cylindrical screw cap within which is disposed a cup structure receiving a cylindrical, rupturable capsule containing CO_2 or compounds that create an anaerobic condition.

3,616,264

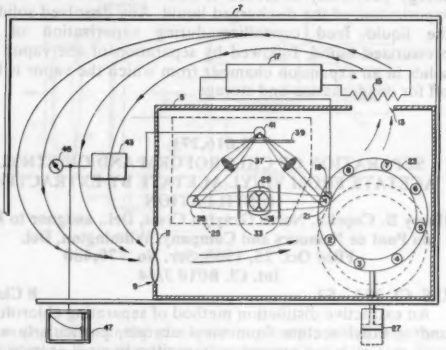
TEMPERATURE-CONTROLLED DISCRETE SAMPLE ANALYZER

Robert A. Ray, and James C. Sternberg, both of Fullerton, Calif., assignors to Beckman Instruments, Inc.

Filed June 30, 1969, Ser. No. 837,697
Int. Cl. C12k *1/10*
U.S. Cl. 195—127 **8 Claims**

There is disclosed an apparatus for controlling the temperature of discrete sample containers in analytical instrumentation. A conveyor containing discrete samples to be analyzed is located in a subcompartment within a larger enclosure. A fan is mounted in a first opening in the subcompartment to move air from the large enclosure into

the subcompartment. A second opening in which a thermal energy transfer element is mounted allows the passage of the air over the thermal energy transfer element back into the



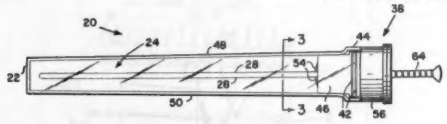
larger enclosure. A temperature sensor contacts a sample container being measured to provide a control signal which is applied to a proportionally controlled power supply connected to the thermal energy transfer element.

3,616,265

DEVICE FOR MAKING A CULTURE OF MICRO-ORGANISMS

Anthony J. Calabrese, Malvern, and Joseph F. Pagano, Paoli, both of Pa., assignors to Smith, Kline & French Laboratories, Philadelphia, Pa.

Filed Aug. 7, 1969, Ser. No. 848,212
Int. Cl. C12b *1/02*
U.S. Cl. 195—139 **10 Claims**



A device for making a culture of micro-organisms has an elongated member which advantageously supports a culture medium on each of two opposite flat faces. A container having an open end is provided for the elongated member. A brush mounted in the container contacts the elongated member intermediate its ends. The open end of the container has removable means to seal it. In a typical operation, the elongated member is removed from the container and the end thereof brought into contact with the area of the patient suspected of having micro-organsims. On returning the elongated member to the container it passes the brush which wipes along the member to brush the inoculum from the end along the culture medium. Advantageously, the container has a guide member to guide the elongated member and restrict its movement toward the interior surfaces of the container. Preferably the brush forms a part of the guide member and the elongated member has a plug adapted to form a seal with the guide member to permit the withdrawal of the elongated member from the container either independently of the guide member or together with the guide member.

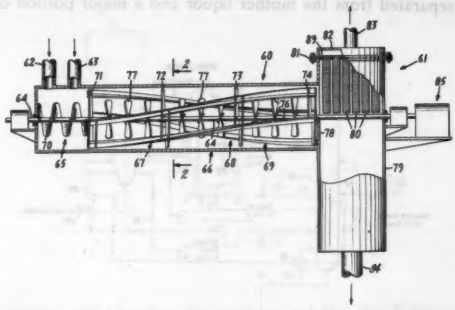
3,616,266

HORIZONTAL RETORT WITH SOLID HEAT TRANSFER MEDIUM

Robert N. Hall, Boulder; Richard H. Beaver, Lakewood, Colo.; Roy Glenn Vawter, Los Angeles, Calif., and Charles J. Mains, Golden, Colo., assignors to The Oil Shale Corporation, New York, N.Y.

Filed Apr. 29, 1969, Ser. No. 820,140
Int. Cl. C10b *1/06*
U.S. Cl. 202—118 **3 Claims**

A pyrolyzer or retort having a conveying section and a mixing section which latter section is composed of a plurality of pyrolysis chambers having means for conveying and



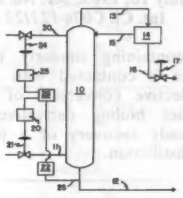
concurrently retarding the flow of intermixed solid raw material and solid heat carriers.

3,616,267

PROCESS CONTROL FOR EXTRACTIVE DISTILLATION OPERATION HAVING A CONSTANT TAKE-OFF VOLUME PRODUCT STREAM

George A. McNeill, Springfield, Mass., and Jerry D. Sacks, Houston, Tex., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 2, 1968, Ser. No. 764,395
Int. Cl. B01d *3/42*
U.S. Cl. 203—3 **3 Claims**



A process for the continuous separation of a feed mixture in a separation zone having a plurality of product streams withdrawn from said separation zone, at least one of said product streams being withdrawn from an upper region of said separation zone and at least one of said product streams being withdrawn from a lower region of said separation zone, said process comprising passing said feed mixture to a column in said separation zone, setting at least one of said product streams of said column at a constant takeoff volume, measuring a property representative of the composition of one of said product streams and converting said measurement to a signal representative of said measurement and using said signal to manipulate the flow rate of said feed mixture in response to such measurement such that such measurement remains substantially constant at a predetermined value.

3,616,268

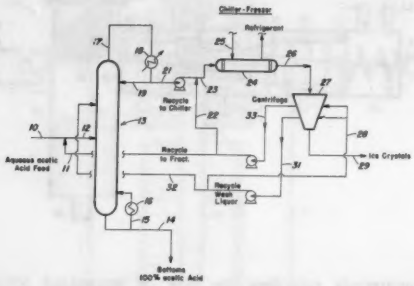
ACETIC ACID RECOVERY FROM AQUEOUS SOLUTION BY DISTILLATION AND CRYSTALLIZATION

Philip J. Philliou, Fort Lee, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Feb. 24, 1969, Ser. No. 801,400
Int. Cl. B01d *9/04;* **C07c** *53/08*
U.S. Cl. 203—16 **5 Claims**

A process for recovering acetic acid from dilute aqueous solutions thereof wherein the dilute acetic acid is introduced into a fractionator to produce an acetic acid bottoms and a dilute acetic acid overhead, containing between about 7 and about 10 weight percent acetic acid, the remainder being water. The overhead is then cooled to a temperature at which a portion of the water solidifies, thereby producing a slurry of ice crystals in a concentrated acetic acid mother

liquor, containing between about 11 and about 55 weight percent acetic acid, with the remainder being water. The ice is separated from the mother liquor and a major portion of



the mother liquor is recycled to the fractionator to effect recovery of acetic acid. The remaining portion of the mother liquor is combined with the overhead, prior to cooling, to regulate the slurry consistency.

3,616,269

METHOD FOR THE PURIFICATION OF MALONONITRILE BY THE ADDITION OF CYCLOPENTADIENE FOLLOWED BY DISTILLATION

David Aelony, and William J. McKillip, both of Minneapolis, Minn., assignors to Ashland Oil, Inc., Houston, Tex.

Filed July 10, 1969, Ser. No. 840,837
Int. Cl. C07c *121/22*
U.S. Cl. 203—38 **5 Claims**

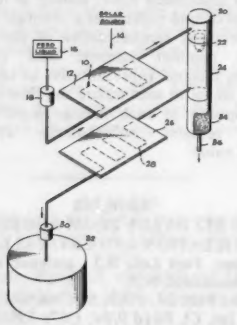
Malononitrile containing similarly boiling unsaturated dinitrile impurities is contacted with cyclopentadiene to result in the selective conversion of said impurities to substantially higher boiling derivatives thereof thereby permitting the ready recovery of a purified fraction of malononitrile by distillation.

3,616,270

PROCESS AND APPARATUS FOR FLASH DISTILLATION WITH PRESSURE AND FLOW OF LIQUID IN PREHEATER CONTROLLED

Joseph A. Ferrara, P.O. Box 398 6411 Elwood St., Joshua Tree, Calif.

Filed Dec. 20, 1968, Ser. No. 785,576
Int. Cl. B01d *3/00*
U.S. Cl. 203—47 **8 Claims**



Water still system for utilizing solar energy and/or waste heat to distill water and chemicals. A pressure vessel having a given rate of thermal expansion is filled with a distillable feed liquid having a higher rate of thermal expansion. Application of heat, as by solar energy or waste heat, to the vessel causes the liquid to expand at a faster rate than the pressure vessel, thereby both pressurizing the liquid and elastically stretching the pressure vessel walls. The pressure vessel is provided with a liquid output control valve which opens at a predetermined pressure for discharging a small portion of the pressurized liquid through a vapor-producing device whereby the heat energy previously absorbed is converted into the heat of vaporization of the discharged liquid. Any dissolved solids in the liquid feed crystallize during vaporization of the pressurized liquid, followed by separation of the vapor and solids in an expansion chamber from which the vapor is bled off for condensation and storage.

3,616,271

SEPARATION OF CHLOROFORM AND/OR ETHYL ACETATE FROM VINYL ACETATE BY EXTRACTIVE DISTILLATION

Harry B. Copelin, North Graylyn Crest, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 25, 1968, Ser. No. 770,480
Int. Cl. B01d *3/34*
U.S. Cl. 203—52 **8 Claims**

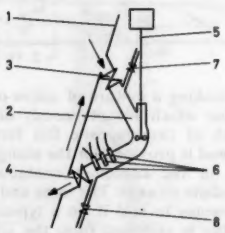
An extractive distillation method of separating chloroform, and/or ethyl acetate from vinyl acetate, particularly when such materials are present as impurities in vinyl acetate. The method involves using a hydrocarbon, e.g., an acyclic aliphatic, an alkyl aromatic, or a cycloaliphatic hydrocarbon having a boiling point of at least 100° C., e.g., 100°–250° C., as the extraction solvent.

3,616,272

APPARATUS FOR MAKING CONTINUOUS MEASUREMENTS IN LIQUID MEDIA

Alfred Goerg, Bloney/Vaud, and Michel Chevalley, Bex/Vaud, both of Switzerland, assignors to Ciba Limited, Basel, Switzerland

Filed Oct. 18, 1967, Ser. No. 676,299
Claims priority, application Switzerland, Oct. 21, 1966, 15319/66
Int. Cl. G01n *27/46*
U.S. Cl. 204—1 T **4 Claims**



The invention relates to apparatus for making continuous measurements in liquid media slowly traveling upwardly, which tend to form deposits, in which apparatus a branch line contains at least one measuring sensor and a pump located before the measuring point in the flow direction and is connected with the apparatus through which the medium to be measured flows in a manner such that its induction end is attached at the point where the measurement is to be taken and its pressure end below this point and the measuring point located in between each point of the branch line being inclined to the horizontal.

3,616,273

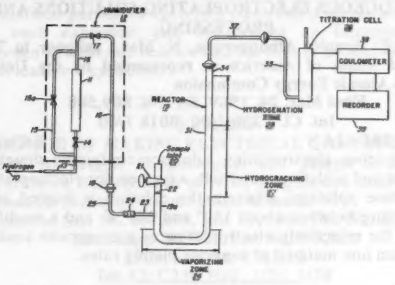
NITROGEN DETERMINATION AND APPARATUS THEREFOR

Itsumi Jack Oita, Chicago, Ill., assignor to Standard Oil Company, Chicago, Ill.

Filed Apr. 1, 1968, Ser. No. 717,889
Int. Cl. G01n *27/42*
U.S. Cl. 204—1 T **20 Claims**

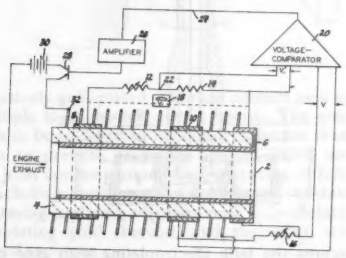
A method and apparatus for quantitatively determining the nitrogen content of organic materials, especially those organic materials having boiling points in excess of about

450° F. The method involves hydrocracking the organic material, hydrogenating the nitrogen to ammonia, and



measuring the quantity of ammonia present, which may then be related to the original nitrogen composition.

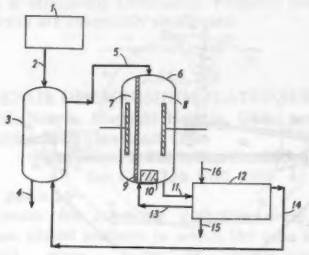
3,616,274
METHOD AND APPARATUS FOR MONITORING EXHAUST GAS
David S. Eddy, Roseville, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Nov. 24, 1969, Ser. No. 879,126
Int. Cl. G01n *27/46*
U.S. Cl. 204—1 T **5 Claims**



A solid electrolyte, electrochemical exhaust gas sensor which is self-correcting with respect to maintaining its operating temperature substantially constant. The sensor comprises two electrochemical cells sharing a common electrolyte but externally loaded differently to produce different terminal voltages. An electronically detected imbalance between the two voltages produces a thermal correction signal which activates appropriate heating or cooling means.

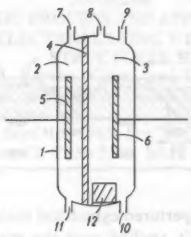
3,616,275
PROCESS FOR CONCENTRATING A METAL OF VARIABLE VALENCE IN AQUEOUS SOLUTION
Alfred Schneider, Morristown, and Arnold Leslie Ayers, Convent Station, both of N.J., assignors to Allied Chemical Corporation, New York, N.Y.
Filed Apr. 14, 1969, Ser. No. 815,713
Int. Cl. B01k *3/00*
U.S. Cl. 204—1.5 **7 Claims**

Method for concentrating a metal of variable valence in aqueous solution by extracting the metal with an immiscible organic solvent, separating the resulting immiscible solutions, forming a dispersion by agitating the organic solution with an immiscible aqueous solution which is a preferential solvent for the metal in a different valence state, passing an electric current through the dispersion in the cathode zone of an electrolytic cell (if a lower valence state is desired) or in the anode zone (if a higher valence state is desired), the cathode and anode zones being separated by a porous membrane, thereby effecting a valence change in the metal and a transfer to the aqueous solution, separating the immiscible



solutions and recycling the aqueous solution for forming a dispersion with fresh organic solution.

3,616,276
PROCESS FOR CHANGING THE VALENCE OF A METAL OF VARIABLE VALENCE IN AN ORGANIC SOLUTION
Alfred Schneider, Morristown, and Arnold Leslie Ayers, Convent Station, both of N.J., assignors to Allied Chemical Corporation, New York, N.Y.
Filed Apr. 14, 1969, Ser. No. 815,714
Int. Cl. B01k *3/00*
U.S. Cl. 204—1.5 **14 Claims**

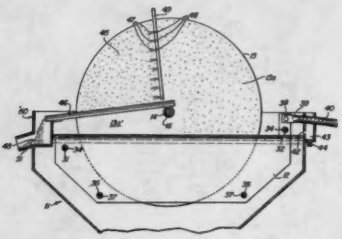


A process for changing the valence of a metal of variable valence in an organic solution whereby a dispersion is formed by agitating the organic solution with an immiscible aqueous solution and an electric current is passed through the dispersion in the cathode zone of an electrolytic cell (if a lower valence state is desired) or in the anode zone of the cell (if a higher valence state is desired), the cathode and anode zones of the cell being separated by a porous membrane, so that the valence state of the metal becomes higher or lower. When the distribution coefficient of the metal varies with a change in valence, the process also provides a means of effecting a transfer of the metal from the organic solution to the aqueous solution.

3,616,277
METHOD FOR THE ELECTRODEPOSITION OF COPPER POWDER
David L. Adamson, and William M. Tuddenham, both of Salt Lake City, Utah, assignors to Kennecott Copper Corporation, New York, N.Y.
Filed July 26, 1968, Ser. No. 748,034
Int. Cl. C22d *5/00*; **B23p** *1/00*; **B01k** *3/00*
U.S. Cl. 204—10 **8 Claims**

Metallic powder, e.g., copper powder, is deposited on a series of disc-shaped cathodes as they turn through an electrolytic solution of the metal. The cathodes, preferably of titanium, are partially immersed in a bath of electrolyte contained in an electrolytic cell tank. Insoluble anodes, preferably of platinized titanium, are disposed in the tank in interleaved arrangement with the cathodes. Powder is continuously deposited on the cathodes and continuously removed by doctor blades, preferably of plastic, mounted

adjacent the cathodes above the electrolyte level of the cell. In the production of copper powder, the cell operates at a much higher temperature, current density, and acid



concentration—and with a much lower copper ion concentration in the electrolyte—than is typical for the electrodeposition of copper in electrolytic cells.

3,616,278

METHOD FOR MAKING A CYLINDRICAL FILM SCREEN

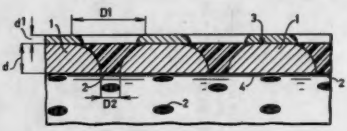
Lodewijk Jansen, St. Anthonis, Netherlands, assignor to Stork Amsterdam N.V., Amsterdam, Netherlands

Filed July 26, 1968, Ser. No. 748,054

Claims priority, application Netherlands, July 27, 1967, 6710441

Int. Cl. C23b *7/00, 7/02*

U.S. Cl. 204—11 **3 Claims**



Starting with an apertured cylindrical matrix an electrically insulating material is applied over the matrix to close the matrix apertures. A layer of metal is then deposited electrically on the matrix to form a metal film screen. A layer of transparent plastic material is then applied onto the metal film screen and the film screen of metal and transparent plastic is then removed from the matrix. The starting matrix may be expanded by mandrel or the like prior to the closing of the matrix openings and to carrying out the other steps and the outer diameter of the matrix is then reduced prior to removing the film screen therefrom. The starting cylindrical matrix may also comprise a thin-walled apertured sleeve which is deformed into a kidney-shaped section to reduce its outer diameter prior to removing the film screen therefrom.

3,616,279

ELECTROLYTE METHOD AND COMPOSITION FOR COLORING TITANIUM AND ITS ALLOYS

Earl W. Kendall, Bonita, Calif., assignor to Rohr Corporation

Filed May 27, 1968, Ser. No. 732,032

Int. Cl. C23b *5/48, 1/00, 9/00*

U.S. Cl. 204—14 N **19 Claims**

Titanium and titanium alloys are colored by electrolytic action to provide a colored surface of the nature of an anodized film. The colors imparted are controlled by voltage input to the electrolyte so that a wide selection of colors, each corresponding to a specific voltage level, may be obtained and reproduced from one surface to another by use of the same selected voltage levels. The electrolyte is a two-part composition consisting of an organic and an inorganic constituent. The organic constituent is one of a group of amides of which dimethylformamide is preferred. The inorganic constituent is a fluoride-bearing compound of which fluoboric acid is preferred.

3,616,280

NONAQUEOUS ELECTROPLATING SOLUTIONS AND PROCESSING

Vernon E. Arnold, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Atomic Energy Commission

Filed Mar. 24, 1969, Ser. No. 809,508

Int. Cl. C23b *5/00;* **B01k** *1/00*

U.S. Cl. 204—14 N **6 Claims**

Nonaqueous electroplating solutions containing dimethyl sulfoxide and a plating metal salt, a process for electroplating using these solutions wherein the solution is heated to a temperature between about 160° and 200° F. and a modified process for selectively electroplating as a composite coating more than one material at separate plating rates.

3,616,281

SELECTIVE PLATING OF REEDS IN BULK

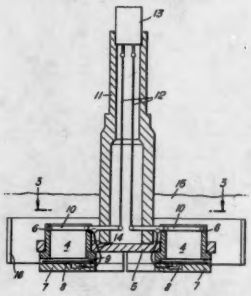
Brian Ernest Head, Bexley, and Colin Stratford, Croydon, both of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Feb. 11, 1970, Ser. No. 10,575

Claims priority, application Great Britain, Feb. 26, 1969, 10259/69

Int. Cl. C23b *5/48, 5/58, 5/68*

U.S. Cl. 204—15 **10 Claims**



This concerns the bulk electroplating with gold of reed contact blades. The blades are located in insulating pots with their contact tips uppermost and extending beyond the rims of the pots. The rim and the base of the pots are metallized and, with the blades, form the cathode of the plating surface. During plating the major parts of the reeds are screened from the plating flow by the insulating sidewalls of the pots, gold being plated only on the exposed contact tips.

3,616,282

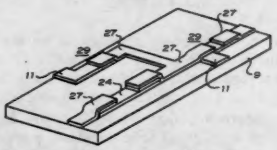
METHOD OF PRODUCING THIN-FILM CIRCUIT ELEMENTS

George E. Bodway, Mountain View, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 14, 1968, Ser. No. 775,828

Int. Cl. C23b *5/48, 5/52, 5/24*

U.S. Cl. 204—15 **14 Claims**



Thin-film resistors and capacitors are formed and connected on a common substrate with high yield by forming

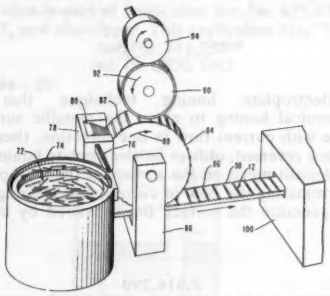
on the substrate a first tantalum electrode for each capacitor; by anodizing a selected portion of each first electrode; by forming on the substrate a tantalum nitride element for each resistor; by heattreating the structure; by reanodizing the selected portion of each first electrode; by forming on the reanodized portion of each first electrode a second electrode for each capacitor; and by forming an interconnection between at least one resistor and the first or second electrode of at least one capacitor.

3,616,283

METHOD OF MAKING ELECTRICAL CONTACT PINS

Robert A. Magee, Poughkeepsie, and Joseph S. Scioscia, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 697,379, Jan. 12, 1968, Pat. No. 3,525,066. Filed Sept. 29, 1969, Ser. No. 870,912
1969, Ser. No. 870,912
Int. Cl. C23b *5/48, 5/56, 5/58*
U.S. Cl. 204—15 **3 Claims**



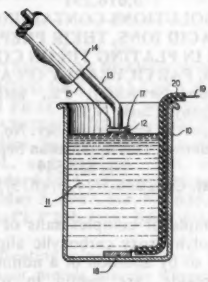
Selectively gold-plated electrical contact pins are mounted in multiple layer printed circuit boards. The gold plating at regions to be soldered to the board is thinner than at contact regions to prevent excessive tin-gold union and resultant solder joint contamination. Also, a process of fabricating the pins including applying a resinous based substance thereon and forming a plating resistive mask at preselected regions, electroplating gold thereon, and thereafter removing the mask and replating.

3,616,284

PROCESSING ARRAYS OF JUNCTION DEVICES

Max G. Bodmer, Short Hills; Merton H. Crowell, Morristown, and Norman C. Wittwer, Jr., Oldwick, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Aug. 21, 1968, Ser. No. 754,183
Int. Cl. C23b *5/48, 7/00*
U.S. Cl. 204—16 **5 Claims**



The specification describes a method for processing junction or barrier layer arrays to eliminate leakage defects. The array is anodized under mild electrolytic conditions which reverse bias the diodes. Since the array is reverse biased, anodization occurs selectively at the sites of current leakage and in proportion to the amount of leakage until the leakage is effectively eliminated. Properly formed elements of the array are essentially unaffected.

3,616,285

REPAIR OF CHROMIUM PLATED SURFACES

Joseph C. Norris, Mayfield Heights, Ohio, assignor to Sifco Industries, Inc., Cleveland, Ohio

Filed Dec. 31, 1969, Ser. No. 889,676
Int. Cl. C23b *7/00, 1/00*
U.S. Cl. 204—16 **17 Claims**

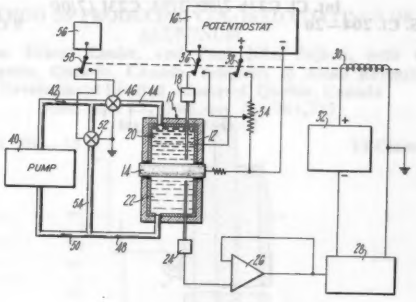
A process for repairing defective areas or spots in chromium plated surfaces in which the area is subjected to sequential steps, such as mechanical cleaning, electrocleaning, electroactivating, copper electroplating, nickel electroplating, electrocleaning and electroactivating the nickel deposit, and then chromium plating the nickel deposit. Prior to any metal deposition, the original chromium deposit is electrolytically removed from a band which borders the perimeter of the defective area. The copper electrodeposits (if used) and the nickel electrodeposit then cover the defective area and at least part of the bordering band but do not reach the contiguous originally deposited chrome-plate from which the copper and/or nickel is more likely to peel. The final chromium plating covers all of the defective area, bordering band, and contiguous originally deposited chrome-plate.

3,616,286

AUTOMATIC PROCESS AND APPARATUS FOR UNIFORM ELECTROPLATING WITHIN POROUS STRUCTURES

John A. Aylward, Vernon, Conn., and Lawrence J. Bregoli, Westfield, Mass., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Sept. 15, 1969, Ser. No. 862,151
Int. Cl. C23b *5/48;* **B01k** *3/00*
U.S. Cl. 204—24 **9 Claims**



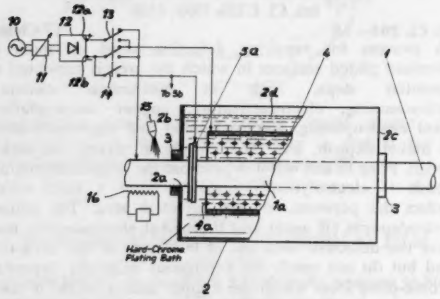
An automatic process for uniformly electroplating the internal surfaces of conducting porous structures. The method is particularly suitable for the electrodeposition of a catalytic material within a fuel cell electrode. A potential pulse travels through the porous structure upon the initial application of a plating potential to the structure causing local depletion of the ions in solution within the pores of the structure. Exhaustion of ions is sensed causing cessation of the applied potential while scheduling a flow of fresh plating solution through the electrode. Replenishment of ions triggers a new plating cycle.

3,616,287

METHOD FOR HARD-CHROME PLATING LARGE METALLIC SURFACES

Antoaneta M. Draghicescu, and Aurel C. Radoi, both of Bucharest, Romania, assignors to Institutul de Cercetari Technologice Pentru Constructii de Masini

Filed Apr. 7, 1969, Ser. No. 813,828
Int. Cl. C23b 5/56, 5/58; B01k 3/00
U.S. Cl. 204—25 6 Claims



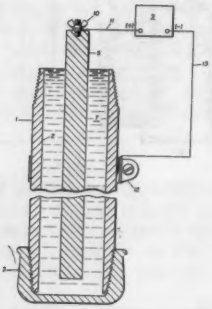
A method of hard-chromium plating elongated bodies of large surface area wherein the body is advanced in stages through the chromium plating bath relative to the anode, and chromium plating is carried out during the transverse in which the substrate is stationary. A pair of equipotential screens is provided in axially spaced relationship at each end of the plating zone, at least one of the screens being positioned upon the previously coated portion of the substrate at a location in which the prior plating has reached its maximum thickness.

3,616,288

CEMENT-LINED METAL PIPE WITH IMPROVED BOND BETWEEN PIPE AND LINING

Earl S. Snavely, Jr., Arlington, Tex., assignor to Mobil Oil Corporation

Filed June 26, 1969, Ser. No. 836,706
Int. Cl. C23b 7/00, 5/56; C23f 17/00
U.S. Cl. 204—26 9 Claims



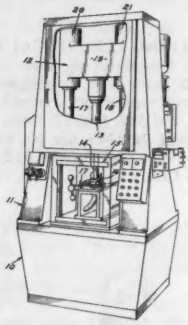
This specification discloses an improved cement-lined pipe and a method of roughening the interior surface of metal pipe in preparation for receiving a cement lining. The interior surface is roughened by depositing metal in the form of protrusions from an electrolytic solution by passing direct current therethrough. Cement lining may be applied to the interior surface of the pipe having protrusions formed thereon to produce a cement-lined pipe having increased bond strength between the cement and the pipe.

3,616,289

ELECTROPLATE HONING METHOD

Myron P. Ellis, Royal Oak, and Richard J. Gavasso, Detroit, both of Mich., assignors to Micromatic Hone Corporation, Detroit, Mich.

Filed July 1, 1969, Ser. No. 838,113
Int. Cl. C23b 5/56; B23p 1/00, 1/02
U.S. Cl. 204—26 3 Claims



An electroplate honing technique that utilizes electrochemical honing to clean the metallic surface of a workpiece with current flow in one direction, then with the current flow reversed, utilizes an electroplate honing cycle to plate or deposit metal on the surface of the workpiece, then finally terminating the flow of current and utilizing a honing cycle to generate the surface finish desired by mechanical abrasion.

3,616,290

METHOD OF MAKING PLATED MEMORY FILM

Emil Toledo, Natick, and Peter Semienko, Roslindale, both of Mass., assignors to Honeywell Inc., Minneapolis, Minn.

Continuation-in-part of application Ser. No. 606,555, Jan. 3, 1967, now abandoned. This application May 28, 1969, Ser. No. 828,723
Int. Cl. C23b 5/32
U.S. Cl. 204—27 7 Claims

Thin magnetic nickel-iron alloy memory films electroplated from an aqueous electrolyte including chloride, sulfate and ammonium sulfate as nickel source ion materials. Such an electrolyte is found to improve bath stability and reliability in continuous plating and also improve magnetic memory properties while alleviating such prior art electroplating difficulties as bath instability, decomposition, residue, difficulty of analysis, source material impurity and unreliability, source ion depletion and control over magnetic properties. The resultant plate has improved microstructure, with reduced stress and finer (controlled) grain structure and also has superior magnetic flux density and dispersion characteristics.

3,616,291

STANNOUS SOLUTIONS CONTAINING HYDROXY CARBOXYLIC ACID IONS, THEIR PREPARATION, AND THEIR USE IN PLATING TIN ON CONDUCTIVE SURFACES, PARTICULARLY ON ALUMINUM

Harold P. Wilson, Sewickley, Pa., assignor to Vulcan Materials Company, Clark, N.J.

Continuation-in-part of application Ser. No. 790,157, Jan. 9, 1969, now abandoned. This application Sept. 16, 1969, Ser. No. 858,544
Int. Cl. C23b 5/14, 5/46, 5/50
U.S. Cl. 204—27 19 Claims

Solutions of simple or complex salts of tin and gluconic acid or similar polyhydroxy carboxylic aliphatic acid, made neutral or nearly so by addition of a nonmetal base such as ammonium hydroxide, are useful in forming a dense, adherent tin plate on conductive surfaces. They are particularly useful in plating tin metal on aluminum or aluminum alloys.

3,616,292

ALUMATED STANNOUS SULFATE SOLUTIONS THEIR PREPARATION AND THEIR USE IN PLATING ON CONDUCTIVE SURFACES, PARTICULARLY ON ALUMINUM

Harold P. Wilson, Sewickley, Pa., assignor to Vulcan Materials Company, Clark, N.J.

Filed Mar. 6, 1969, Ser. No. 805,015
Int. Cl. C23b 5/58, 5/14, 5/46
U.S. Cl. 204—28 11 Claims

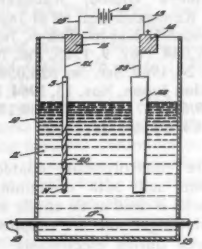
Solutions containing stannous sulfate and aluminum sulfate, as well as free sulfuric acid, and preferably a chelating agent, are useful in forming a dense, adherent tin plate on conductive surfaces. They are particularly useful in plating tin metal on aluminum or aluminum alloys. Conventional additives such as brightening and conditioning agents, e.g., polyalkylene glycols, may be included.

3,616,293

METHOD OF MAKING A METAL ARTICLE HAVING A CHROMIUM BONDED SURFACE

Louis F. Ranieri, 4036 North Central Ave., Chicago, Ill.

Continuation-in-part of application Ser. No. 638,676, Apr. 26, 1967, now abandoned. This application Mar. 7, 1968, Ser. No. 711,237
Int. Cl. C23b 5/62
U.S. Cl. 204—29 4 Claims



A method of electrodepositing chromium upon the surface of magnetizable metal article to effect a bonding therewith and a diffusion therethrough of chromium to increase the surface hardness, and particularly the scratch hardness thereof, and the metal article so produced. The method includes the steps of passing a current of sufficient strength and density through a chromium plating bath to effect a penetration of chromium into a magnetized metal article as the cathode. Magnetization of the article may be effected prior to the electrodeposition step so as to leave the metal article with residual magnetism when made the cathode in the electrodeposition bath. The composition of the electrolyte used preferably contains boric acid, in addition to chromic acid and a source of sulfate ions such as is customarily used in chromium electroplating baths.

3,616,294

SURFACE TREATMENT OF PLASTICS WITH MINERAL ACIDS CONTAINING HEXAVALENT CHROMIUM AND A PETROLEUM FRACTION OR NEOPENTYL GROUP CONTAINING ACIDS AND OLEFINS

Habet M. Khelghatian, Springfield, Pa.; James E. Fitzpatrick, New Castle, Del., and James L. Jezl, Swarthmore, Pa., assignors to Standard Oil Company, Chicago, Ill.

Filed May 3, 1967, Ser. No. 635,683
Int. Cl. C23b 5/60; B44d 1/22
U.S. Cl. 204—30 3 Claims

In the art of treating plastic surfaces to improve the adhesion of paints or metals thereto wherein the surface is treated with a strong mineral acid solution containing hexavalent chromium, the adhesion is improved by adding to the acid solution from 0.1 to 6 percent by volume of a petroleum fraction boiling between 80° C. and 240° C. which is rich in branched chain aliphatic hydrocarbons and alicyclic hydrocarbons, olefins containing a neopentyl group, or carboxylic acids containing a neopentyl group.

3,616,295

LOW-TEMPERATURE TRANSFORMATION OF NONCONDUCTIVE SUBSTRATES TO CONDUCTIVE SUBSTRATES

Sung K. Lee, Niagara, N.Y., assignor to Hooker Chemical Corporation, Niagara Falls, N.Y.

Filed Dec. 28, 1967, Ser. No. 694,122
Int. Cl. C23b 5/60
U.S. Cl. 204—30 15 Claims

Substrates, particularly thermoplastic resins and polymers, are plated with metals by pretreatment of the substrate with phosphorus in an organic solvent to deposit phosphorus at the surface of the substrate followed by subjecting the thus treated substrate with a metal salt or complex thereof, in the presence of OH or Br_3H^1 or AlR_3H^1 or mixtures thereof, to form a metal-phosphorus compound, wherein each R is individually selected from the group consisting of alkyl, aryl and hydrogen. The treatment with the metal salt solution can be accomplished at room temperature. The resulting surface is conductive and can be readily electroplated by conventional techniques.

3,616,296

METHOD FOR METALLIZING PLASTICS

Gunther Bernhardt, Hangelar, and Robert Buning, Troisdorf-Sieglar, both of Germany, assignors to Dynamit Nobel AG, Postfach, Germany

Filed Dec. 31, 1969, Ser. No. 889,707
Claims priority, application Germany, Feb. 2, 1969, P 19 05 097.6
Int. Cl. B44d 1/092; C23c 3/02
U.S. Cl. 204—30 9 Claims

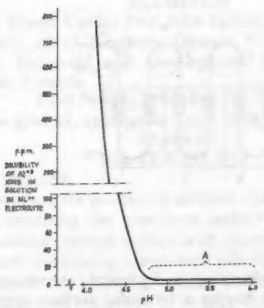
Improved process for metallizing various plastic materials, including shaped vinyl chloride polymer and acrylonitrile-butadiene-styrene polymer articles, which includes using as the sensitizing solution in the known metallization process a solution which contains at least one tin IV salt dissolved therein in addition to the tin II and other conventional components. The sensitizing solution is itself disclosed and claimed.

3,616,297

METHOD OF PRODUCING COLORED COATINGS OF ALUMINUM

William Ernest Cooke, and Paul John Sajben, both of Kingston, Ontario, Canada, assignors to Alcan Research and Development Limited, Montreal, Quebec, Canada

Filed Sept. 23, 1968, Ser. No. 761,717
Int. Cl. C23b 9/02
U.S. Cl. 204—35 N 13 Claims



In procedure for producing colored coatings on aluminum by first anodizing the aluminum surface and then treating such anodically coated surface with alternating current in an acidic bath containing Ni^{++} or Co^{++} ions to produce a

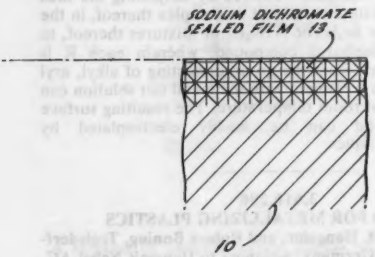
colored deposit in the coating, simplified control with effective coloring results is achieved by providing a content of combined aluminum in the acidic bath while maintaining the bath at a pH, notably about 5 to about 6, which restricts the dissolved Al ion concentration to a low value.

3,616,298

SEALING ANODIC FILMS

Wayne M. Fassell, Jr., Newport Beach, Calif., assignor to Philco-Ford Corporation, Philadelphia, Pa.

Filed Nov. 22, 1968, Ser. No. 778,222
Int. Cl. C23f *17/00, 9/02*
U.S. Cl. 204—35 **8 Claims**



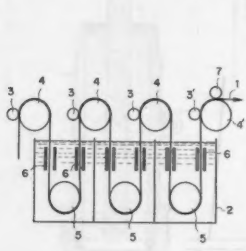
Fabrication of corrosion resistant materials. Corrosion-resistance of anodized aluminum is promoted by sealing the anodized surface film in nickel acetate, followed by sodium dichromate, and keeping the temperature of these solutions—mainly that of the acetate—substantially below the boiling point and particularly at 160° to 180° F. The product is characterized by firm bonding of chromate ions to aluminum in the anodic film.

3,616,299

PROCESS FOR PRODUCING STEEL PRODUCTS HAVING A HYDRATED CHROMIUM OXIDE FILM EXCELLENT IN THE SURFACE APPEARANCE

Akira Hata, and Tamotu Hinami, both of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Mar. 24, 1969, Ser. No. 809,891
Claims priority, application Japan, Mar. 28, 1968, 43/19717
Int. Cl. C23b *11/00*
U.S. Cl. 204—35 N **7 Claims**



A process for obtaining a hydrated chromium oxide treated steel article having a beautiful surface appearance without any roll marks by pressing a steel product subjected to the chromic acid cathode electrolytic treatment, while a chromic acid film thus electrodeposited on the surface of the steel product is still wet, immediately after the electrolytic treatment by the help of a leveling roll as an auxiliary holddown roll having a surface hardness of 40° to 90° (A scale) without need of frequently exchanging a holddown roll installed for preventing the formation of arc spots.

3,616,300

COMPOSITES INCLUDING ELECTROCONDUCTIVE REINFORCING MATERIAL FORMED BY ELECTRODEPOSITION AND METHOD OF FORMING THE COMPOSITES

Iqbal Ahmad, Elnora, N.Y., assignor to The United States of America as represented by the Secretary of the Army

Filed Aug. 13, 1969, Ser. No. 850,696
Int. Cl. C23b *5/48;* **B32b** *5/00*
U.S. Cl. 204—38 R **7 Claims**

A method for forming composite material by electrodeposition in which a metal matrix is reinforced by electroconductive filaments. Prior to being fixed to a cathode for encapsulation by the matrix, the filaments are treated so that an electrononconducting film is formed on the surfaces thereof. This insulates the filaments from the electrodeposition process so that the matrix is formed around the filaments without interfering with the matrix buildup so as to encapsulate the filaments free of faulty voids.

3,616,301

PROCESS FOR THE ELECTROLYTIC FORMATION OF ALUMINUM COATINGS ON METALLIC SURFACES IN MOLTEN SALT BATH

Akira Miyata, Tokyo; Chikayoshi Tomita, Tokyo; Akio Suzuki, Tokyo; Hideyo Okubo, Kanagawa-ken, and Masahiko Nagakuni, Kanagawa-ken, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 507,034, Nov. 9, 1965, Pat. No. 3,480,521.
Filed Mar. 24, 1969, Ser. No. 828,050
Claims piority, application Japan, Nov. 13, 1964, Feb. 24, 1965, Feb. 24, 1965, 39/63, 827, 40/10, 330, 40/10, 331.
Int. Cl. C23b *5/22, 5/50*
U.S. Cl. 204—39 **7 Claims**

Metallic surfaces are electrolytically coated Aluminum aluminum in a molten salt bath containing aluminum chloride. Aluminum metal is used as an anode and a metallic surface as a cathode. Hydrogen ions are supplied to the bath from an external source during electrolysis. The metallic surface is electroplated with a metal having a higher hydrogen overvoltage than that for aluminum prior to plating aluminum thereon.

3,616,302

INSOLUBLE ANODE FOR ELECTROLYSIS AND A METHOD FOR ITS PRODUCTION

Kazuya Ohsawa, Yokohama; Keiichi Shimizu, Tanashi, and Takashi Takasue, Tokyo, all of Japan, assignors to The Furerkawa Electric Company Limited, Tokyo, Japan

Filed Feb. 23, 1968, Ser. No. 707,408
Claims priority, application Japan, Feb. 27, 1967, Nov. 6, 1967, 42/12,427 and 42/71,334
Int. Cl. C23b *5/46*
U.S. Cl. 204—40 **4 Claims**

An insoluble anode suitable for use in electrolysis and a method for its production are provided. The anode comprises three components which are:

a. a base substrate treated by sandblasting, said substrate being selected from the group consisting of titanium, zirconium and tantalum or alloys thereof;

b. a thin metal layer formed on said substrate, said thin metal layer being selected from the group consisting of platinum, palladium and rhodium or alloys thereof; and

c. an outermost layer of manganese dioxide electroplated on said thin metal layer in an aqueous solution of manganese sulfate containing about 10 to about 30 grams/liter of free sulfuric acid at a current density of about 0.015 to about 0.007 A./dm.^{2}.

The anode is produced by sandblasting a base substrate metal of titanium or its alloy to form minute indentations on the surface, electroplating on said base substrate metal a thin layer of platinum, and electrodepositing a layer of manganese

dioxide on said thin layer in an aqueous solution of manganese sulfate containing 10–30 g./l. of free sulfuric acid at a current density of 0.015–0.007 A./dm.².

3,616,303

ELECTROLYTIC TREATMENT OF NONFERROUS METALS

William A. Carter, Jr., Gary, Ind., assignor to Inland Steel Company, Chicago, Ill.

Continuation of application Ser. No. 685,314, Nov. 24, 1967, now abandoned. This application July 6, 1970, Ser. No. 56,139

Int. Cl. C23b *5/50, 11/00*

U.S. Cl. 204—41 5 Claims

A two-step electrochemical treatment of a nonferrous metal article in which a first coating of electrolytic chromium plate is deposited on a nonferrous metal surface and a second or surface coating containing chromium both as an oxide of chromium and as metallic chromium is electrolytically codeposited over the chromium plate from a chromic acid solution containing an electroplating additive, preferably a halide ion. A duplex coating is formed which imparts very good corrosion resistance with small amounts of coating material and provides a paintable surface without a painting pretreatment.

3,616,304

METHOD FOR TREATING CHROMIUM-CONTAINING BATHS

Ram Dev Bedi, Oak Park, Mich., and Ronald Dow, Wilton, Conn., assignors to M & T Chemicals Inc., New York, N.Y.

Filed Jan. 26, 1966, Ser. No. 523,116

Int. Cl. C23b *5/06;* B01k *1/00;* C01g *37/00*

U.S. Cl. 204—51 2 Claims

In accordance with certain of its aspects, this invention relates to a novel apparatus and to the process for treating a bath containing trivalent chromium to convert said trivalent chromium to hexavalent chromium which comprises maintaining in said bath an electrolyzing cathode of predetermined area, the surface of which is in intimate electrical contact with a material in a low hydrogen overvoltage state selected from the group consisting of etched iron compound, platinum, palladium, rhodium, iridium, and nickel; maintaining in said bath an electrolyzing anode having a surface area at least equal to the area of said cathode; and electrolyzing said bath between said electrolyzing cathode and said electrolyzing anode at an electrolyzing anode current density of at least 0.3 amperes per square decimeter whereby said trivalent chromium in said bath is converted to said hexavalent chromium.

3,616,305

PROCESS FOR DEPOSITING LEAD

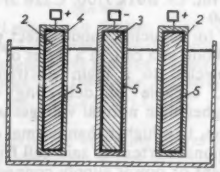
Jean P. Arbez, Paris, France, assignor to Etablissements Eugene Arbez, Paris, France

Filed Sept. 27, 1967, Ser. No. 670,911

Claims priority, application France, Jan. 18, 1967, 91631

Int. Cl. C23b *5/16*

U.S. Cl. 204—53 5 Claims



A method for the controlled electrodeposition of lead to a desired thickness on a cathode plate in an electrolytic bath including the placement of a cathode disposed in spaced apart, vertical, parallel relation between a pair of anode plates in said bath, supporting said cathode and anodes with electrically conductive support frames around the entire peripheral edges thereof, and providing insulating material on the outer surfaces of said support frames exposed to said electrolytic bath to form an even, homogeneous electric field between the anodes and cathode for the deposit of lead coating on the cathode without edge effects.

3,616,306

TIN PLATING BATH AND METHOD

Joseph F. Conoby, Somers, and Kenneth P. Bellinger, Rockville, both of Conn., assignors to Conversion Chemical Corporation, Rockville, Conn.

Filed Nov. 19, 1969, Ser. No. 878,221

Int. Cl. C23b *5/14, 5/46*

U.S. Cl. 204—54 R 32 Claims

An aqueous bath for electroplating tin upon various conductive substrates contains stannous ion, sulfate radical, an imidazoline derivative, a carbinamine compound, and a cyclic aldehyde or ketone brightener. The bath is highly acid and is operable to produce dense, smooth, bright, adherent deposits, particularly at relatively high current densities. These deposits exhibit excellent solderability as plated and after prolonged aging. In addition, the bath avoids step plating when holes are present in the workpiece, and it minimizes the tendency for pitting to occur in the deposit.

3,616,307

PROCESS AND COMPOSITION FOR ANODIZING A TIN-COATED ARTICLE

Richard G. Snyder, Bethlehem, Pa., assignor to Bethlehem Steel Corporation

Filed May 16, 1969, Ser. No. 825,229

Int. Cl. C23b *9/00*

U.S. Cl. 204—56 R 14 Claims

In a method of forming an anodized coating on the surface of a tin-coated ferrous article, the article is subjected to anodic electrolysis in an aqueous electrolyte comprising a dialkali metal phosphate, an alkali metal carbonate and an alkali metal hypophosphite.

3,616,308

METHOD OF PRODUCING COLORED COATINGS ON ALUMINUM

William Ernest Cooke; Paul John Sajben, and Roy Cowieson Spooner, all of Kingston, Ontario, Canada, assignors to Alcan Research and Development Limited, Montreal, Quebec, Canada

Filed Nov. 6, 1968, Ser. No. 773,936

Claims priority, application Great Britain, Nov. 24, 1967, 53,699/67

Int. Cl. C23b *9/02*

U.S. Cl. 204—58 13 Claims

In procedure for producing colored coatings on aluminum by first anodizing the aluminum surface and then treating such anodically coated surface with alternating current in an acidic bath containing metal ions selected from the group consisting of the following cations and anions: Cu^{++}, Ag^{+}, Pb^{++}, and anions consisting of oxygen combined with one of the metals Se, Te and Mn, to produce a colored deposit in the coating, improved coloring results notably in avoiding or inhibiting occurrence of localized nonuniformity, especially with darker or more intense tones, are achieved by maintaining a content of aluminum ions in the bath.

3,616,309

METHOD OF PRODUCING COLORED COATINGS ON ALUMINUM

Tahei Asada, Kobe, Japan; William Ernest Cooke, Kingston, Ontario, Canada, and Paul John Sajben, Kingston, Ontario, Canada, assignors to Alcan Research and Development Limited, Montreal, Quebec, Canada

Filed Nov. 6, 1968, Ser. No. 773,935
Claims priority, application Great Britain, Nov. 24, 1967, 53698/68
Int. Cl. C23b 9/02
U.S. Cl. 204—58 14 Claims

In procedure for producing colored coatings on aluminum by first anodizing the aluminum surface and then treating such anodically coated surface with alternating current in an acidic bath containing metal ions selected from the group consisting of the following cations and anions: Ni^{++}, Co^{++}, Cu^{++}, Ag^{+}, Pb^{++}, and anions consisting of oxygen combined with one of the metals Se, Te and Mn, to produce a colored deposit in the coating, improved coloring results notably in avoiding or inhibiting occurrence of localized nonunifomity, especially with darker or more intense tones, are achieved by maintaining a content of magnesium ions in the bath.

3,616,310

ALUMINUM-ANODIZING PROCESS

Geoffrey Austin Dorsey, Jr., Spokane, Wash., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Mar. 10, 1969, Ser. No. 805,826
Int. Cl. C23b 9/02
U.S. Cl. 204—58 2 Claims

This invention generally relates to the anodic oxidation of aluminum articles in an aqueous sulfuric acid electrolyte. More particularly, this invention is directed to improving the corrosion resistance of the clear, colorless anodic oxide coatings formed in an aqueous sulfuric acid anodizing process by utilizing an aqueous electrolyte containing 7 to 12 percent sulfuric acid and 0.25 to 0.80 percent chromic acid.

3,616,311

INTEGRAL HARD COAT ANODIZING SYSTEM

Erik F. Barkman, and Harold J. Coates, both of Henrico, Va., assignors to Reynolds Metals Company, Richmond, Va.

Continuation-in-part of application Ser. No. 649,095, June 17, 1967, now abandoned, which is a continuation-in-part of application Ser. No. 403,352, Oct. 12, 1964, now abandoned, which is a continuation-in-part of application Ser. No. 353,591, Mar. 20, 1964, now abandoned. This application June 16, 1969, Ser. No. 833,792
Int. Cl. C23f 9/02
U.S. Cl. 204—58 9 Claims

Hard, integrally colored oxide coatings are formed on aluminum and aluminum alloys by anodizing the surface to produce thereon an oxide coating while simultaneously producing a desired coloring effect. There is used as an electrolyte an inorganic acid, such as sulfuric acid, together with an additional acid which is either an aliphatic alpha-hydroxy monocarboxylic or an aliphatic dicarboxylic acid, or sulfamic acid, and a metal salt of either of the aforementioned organic acids, such as a ferric salt. The process employs ordinary temperatures, and a current density between about 12 and 60 amperes per square foot.

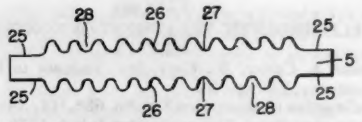
3,616,312

HYDRAZINE MANUFACTURE

Stuart G. McGriff, Alexandria, Va., and Wayne A. McRae, Lexington, Mass., assignors to Ionics, Incorporated, Watertown, Mass.

Division of Ser. No. 542,780, Apr. 15, 1966, Pat. No. 3,496,091.
Filed Sept. 16, 1969, Ser. No. 870,920
1969, Ser. No. 870,920
Int. Cl. B01k 3/00, 3/08, 3/10
U.S. Cl. 204—59 7 Claims

Hydrazine is produced in a two chamber electrolytic cell with anode and cathode chambers separated by an ion exchange membrane. When using an anion exchange membrane, ammonia and nonaqueous solvent are fed to the cathode compartment and hydrazine and solvent are collected from the anode compartment. When using a cation exchange membrane ammonia and nonaqueous solvent are fed to the anode compartment while hydrazine is also



removed from the anode compartment. Similarly, alkyl hydrazines can be produced by feeding a lower alkyl amine instead of ammonia.

3,616,313

POLYMERS BY ELECTROLYSIS OF DIBASIC ACIDS

John M. Mersereau, Cheshire, Conn., assignor to Uniroyal, Inc., New York, N.Y.

Filed May 9, 1969, Ser. No. 823,516
Int. Cl. C08f 1/22, 3/42; B01k 3/00
U.S. Cl. 204—59 3 Claims

A process is provided for synthesizing long-chain alpha, omega-dicarboxy polymers by the electrolysis of dicarboxylic acids.

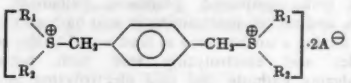
3,616,314

ELECTROLYTIC PROCESS FOR PREPARING[2.2]-PARACYCLOPHANE

William J. Settineri, and Ritchie A. Wessling, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 24, 1969, Ser. No. 879,509
Int. Cl. B01k 3/00
U.S. Cl. 204—59 7 Claims

[2.2]-Paracyclophane is prepared by electrochemically reducing a sulfonium salt having the formula



wherein R_1 and R_2 are alkyl or hydroxy-substituted alkyl radicals of one to 10 carbon atoms and A is an electrolytically acceptable anion. The process is conducted at low current densities.

3,616,315

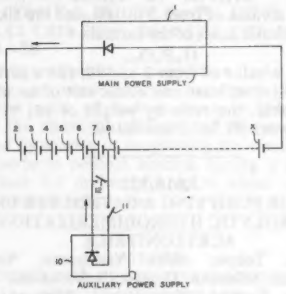
INDUCING AND/OR ELIMINATING POLARIZATION IN ONE CELL OF A SERIES OF CELLS IN OPERATION

William V. Childs, Austin, Tex., assignor to Phillips Petroleum Company

Filed Jan. 29, 1970, Ser. No. 6,836
Int. Cl. B01k 1/00; C22d 3/12
U.S. Cl. 204—60 3 Claims

A procedure for inducing anode effect or polarization by subjecting an anode in a cell, in a series of cells in operation, and being subjected to a main electrical current power supply source, capable of delivering current for said operation at higher than normal voltages across at least one cell in said series, to a higher than normal current density by supplying additional current to said cell from an auxiliary or secondary current or power supply connected to and across said cell in parallel and then discontinuing current supply from said auxiliary supply, thus eliminating the anode effect induced in said cell by thus subjecting the same to a higher than normal voltage. By starting each or less than all of the cells at a time in a series of cells, the anode effect will usually occur in a cell at a time or in less than all of the cells at a

time, thus lessening the strain of a number of cells polarizing simultaneously. When an increased cell voltage or voltage



oscillations of increased frequency occur across a cell, it is about ready for depolarization and the recited procedure can be applied.

3,616,316

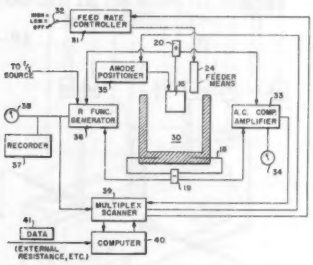
REDUCTION CELL CONTROL SYSTEM

John L. Dewey, Florence, Ala.; William E. Campbell, Portland, and Harry T. Shiver, Portland, Oreg., assignors to Reynolds Metals Company, Richmond, Va.

Continuation of application Ser. No. 400,059, Sept. 29, 1964, now abandoned. This application Jan. 19, 1968, Ser. No. 699,125

Int. Cl. C22d *3/12, 3/02*

U.S. Cl. 204—67 **3 Claims**



Method of operating an electrolytic cell for the production of aluminum including the detection of upset conditions and control of subsequent feeding in order to prevent overheating due to sludging.

3,616,317

ALUMINUM POT LINE AND METHOD OF OPERATING SAME

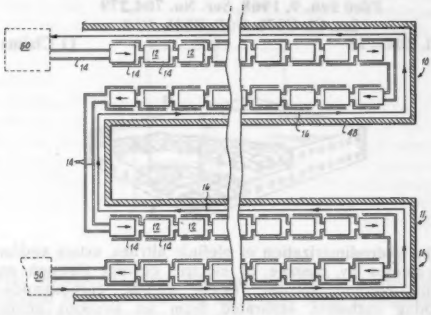
Harold David McLellan, and Walter Keith Armour, both of Kitimat, British Columbia, Canada, assignors to Alcan Research and Development Limited, Montreal, Canada

Filed Sept. 29, 1969, Ser. No. 861,861

Int. Cl. C22d *3/12, 3/02*

U.S. Cl. 204—67 **17 Claims**

In an aluminum pot line including plural electrolytic pots for production of aluminum metal arranged in end-to-end relationship in at least two rows and provided with electricity by plural parallel conductor bus bars arranged longitudinally of the pots, an independent bus bar at the rear of each row of pots for degaussing the magnetic field created by the electricity carried by the conductor bus bars of the opposite row of pots. The degaussing bus bar is located in substantially the same horizontal plane as the conductor bus bars and carries up to about 25 percent of the current of the latter, but in an opposing direction. The electric current of the



degaussing bus bar may be subsequently cycled into the conductor bus bars.

3,616,318

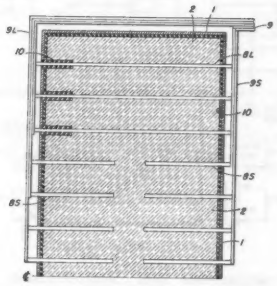
ALUMINUM REDUCTION CELL AND PROCESS

Arthur F. Johnson, 203 Creole Lane, North Gate Urban Farms, Franklin Lakes, N.J.

Filed Nov. 14, 1969, Ser. No. 877,018

Int. Cl. C22d *3/12, 3/02*

U.S. Cl. 204—67 **9 Claims**

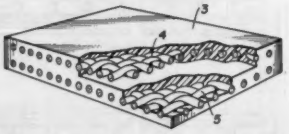


The electrolytic cell of the invention comprises a conventional steel potshell lined with carbonaceous potlining, in which are embedded steel collector bars inwardly projecting from the pot sides and outwardly projecting therethrough to make electrical connection with a horizontal cathode bus which at least partly encircles the potshell. However, something less than 30 percent of the collector bars are electrically insulated from the carbonaceous potlining over portions of their lengths which lay between the potshell sides through which they project and the area vertically under the anodes. The collector bars thus electrically insulated are those in areas where the vertical component of magnetic flux from the encircling cathode bus is the greatest. The process of the invention confines the current flow vertically from the downward-facing anode area to the collector bars in only those areas of the pot where vertical magnetic flux in the molten aluminum cathode layer is a maximum. This does not unduly increase resistance to flow of electrical current through the entire potlining surface area and into the collector bars. The collector bars are each preferably designed to draw substantially equal amounts of current.

3,616,319
ELECTROLYTIC HYDRODIMERIZATION OF OLEFINIC COMPOUNDS

Robert Johnson, Pensacola, Fla., and Roy E. Jones, Atmore, Ala., assignors to Monsanto Company, St. Louis, Mo.

Filed Feb. 9, 1968, Ser. No. 704,279
Int. Cl. C07b 1/00; B01k 3/10
U.S. Cl. 204—73 11 Claims

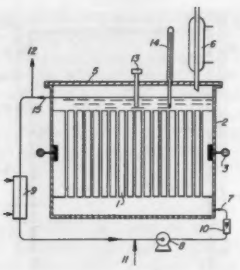


In the hydrodimerization of olefinic nitriles, esters and/or carboxamides by passage of electric current through an aqueous olefinic nitrile-, ester- and/or carboxamide-containing catholyte separated from an aqueous acidic anolyte by a solid cation-permeable membrane, the rate of membrane deterioration is unexpectedly low and undesirable leakage of anolyte and catholyte constituents through the membrane is consequently inhibited by using as the cation-permeable membrane an electrically conductive polymeric matrix reinforced by at least two substantially parallel sheets of woven glass fabric embedded within the matrix.

3,616,320
PRODUCTION OF ADIPONITRILE

Fritz Beck, and Hans Leitner, both of Ludwigshafen, Germany, assignors to Badische Amlin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine) Germany

Filed Mar. 17, 1969, Ser. No. 807,896
Claims priority, application Germany, Oct. 24, 1968, P 18 04 809.4
Int. Cl. C07b 29/06; B01k 3/00
U.S. Cl. 204—73 A 4 Claims



Production of adiponitrile by direct electrochemical hydrodimerization of acrylonitrile in a medium which contains acrylonitrile, and electrolyte salt, water and, if desired, a solvent at a temperature of from 10° to 60° C. and a pH value of from 1 to 10 using liquid-impermeable electrodes. The medium is passed through the pairs of electrodes which are 0.05 to 2 mm. apart. Adiponitrile is an important intermediate for synthetic fiber manufacture.

3,616,321
PROCESS FOR THE PRODUCTION OF ADIPONITRILE

Albert Verheyden, Saint-Denis-Westrem, and Jean Walravens, Watermael-Boitsfort, both of Belgium, assignors to UCB Societe Anonyme, Saint-Gelles-lez-Brussels, Belgium

Filed June 4, 1969, Ser. No. 830,521
Claims priority, application Great Britain, June 6, 1968, 27051/68
Int. Cl. C07b 29/06; C07c 121/26
U.S. Cl. 204—73 26 Claims

Process of hydrodimerization of acrylonitrile to adiponitrile by the direct electrolytic route, by passing a direct electrical current through an electrolytic cell having the anode and cathode in contact with the electrolytic medium, which comprises using an initial electrolysis medium consisting essentially of (a) acrylonitrile, (b) water, (c) at least one alkali salt selected from the group consisting of the alkali salts of condensed polyphosphoric acids of the formula

$$nH_3PO_4—(n-1)H_2O \quad (I)$$

in which n has a value of from 2 to 100, and the alkali salts of polymetaphosphoric acids of the formula

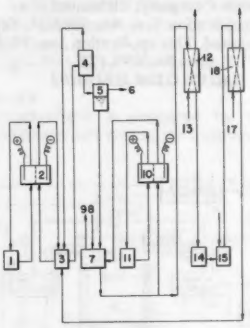
$$H_nP_nO_{3n} \quad (II)$$

in which n has a value of from 2 to 100, (d) a surface-active substance, and (e) at least one acidic salt of an alkali metal and of a polyacid, the ratio by weight of (e) to (c) being comprised between 99.9/0.1 and 0/100.

3,616,322
PROCESS FOR PURIFYING A CATHOLYTE USED FOR ELECTROLYTIC HYDRODIMERIZATION OF ACRYLONITRILE

Maomi Seko, Tokyo; Akira Yomiyama, Nobeoka-shi, Miyazaki-ken; Shinsaku Ogawa, Nobeoka-shi, Miyazaki-ken; Ryozo Komori, Nobeoka-shi, Miyazaki-ken, and Muneo Yoshida, Nobeoka-shi, Miyazaki-ken, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed June 20, 1969, Ser. No. 835,193
Claims priority, application Japan, June 26, 1968, 43/43850
Int. Cl. C07b 29/06
U.S. Cl. 204—73 A 7 Claims



In a process for producing adiponitrile by electrolyzing a mixture containing acrylonitrile, a supporting electrolyte and water, the improvement characterized in that said electrolysis is carried out by removing acrylonitrile from a catholyte contaminated with metal ions, reacting the metal ions contained in the catholyte with carbon dioxide in an alkaline region of a pH value of not lower than 10 thereby precipitating the contaminant metal ions as carbonates thereof, removing thus precipitated carbonates therefrom and recycling the resulting purified solution of the supporting electrolyte as a catholyte.

3,616,323
ELECTROCHEMICAL CONVERSION OF PHENOL TO HYDROQUINONE

Frank H. Covitz, Lebanon, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jan. 21, 1970, Ser. No. 4,779
Int. Cl. C01b 29/06; B01k 3/04; C07c 37/00
U.S. Cl. 204—78 7 Claims

The electrical efficiency of the electrochemical conversion of phenol to hydroquinone using lead anodes has been enhanced by preanodizing the lead anodes in an aqueous sulfuric acid solution containing various inorganic salts of chromium, manganese, iron, vanadium, or nickel.

3,616,324

ELECTROCHEMICAL CONVERSION OF PHENOL TO HYDROQUINONE

Frank H. Covitz, Lebanon, and Robert V. Carrubba, Cranford, both of N.J., assignors to Union Carbide Corporation, New York, N.Y.

Filed Feb. 19, 1970, Ser. No. 12,865
Int. Cl. C01b 29/06; B01k 3/04; C07c 37/00
U.S. Cl. 204—78 4 Claims

The electrochemical conversion of phenol to hydroquinone or benzoquinone has been improved by increasing the ratio of hydroquinone to p-benzoquinone formed and the chemical efficiency of the process. This is accomplished by scoring or roughening the electrodes so that the planar surfaces contain notches having a depth and a width of about 0.1 millimeters up to about one-fifth the distance between the electrodes.

3,616,325

PROCESS FOR PRODUCING POTASSIUM PEROXYDIPHOSPHATE

Paul R. Mucenieks, Trenton, N.J., assignor to FMC Corporation, New York, N.Y.

Filed Dec. 6, 1967, Ser. No. 688,525
Int. Cl. C01b 15/16
U.S. Cl. 204—82 10 Claims

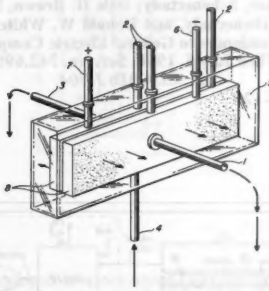
Potassium peroxydiphosphate is produced by electrolyzing an anolyte containing an aqueous mixture of potassium, phosphate and fluoride ions and catholyte containing an aqueous mixture of phosphate ions, said anolyte and catholyte being separated by diaphragm means; peroxydiphosphate values are produced in the anolyte at a pH of from about 9.7 to 14.5, and these values are prevented from substantial migration to the catholyte by said diaphragm.

3,616,326

SEPARATION OF RARE EARTHS BY ELECTROLYSIS WITH PAROUS CARBON ELECTRODES

Edward I. Onstott, Los Alamos, N. Mex.

Filed Oct. 22, 1969, Ser. No. 868,440
Int. Cl. C01b 17/96
U.S. Cl. 204—93 2 Claims



A method of separating europium from trivalent rare earth elements by passing an electrolyte containing a mixture of such elements between porous carbon electrodes at a cell potential of 2 to 2.5 volts. As the mixture of cations passes through the porous cathode, Eu(III) is selectively reduced to Eu(II) which can then be precipitated as $EuSO_4$.

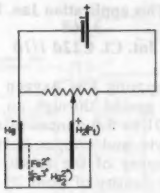
3,616,327

PREPARING FERROUS SALT SOLUTIONS

Embrecht Barendrecht, and John W. Geus, both of Geleen, Netherlands, assignors to Stamicarbon N.V., Heerlen, Netherlands

Filed Nov. 10, 1969, Ser. No. 875,072
Claims priority, application Netherlands, Nov. 8, 1968, 6815906
Int. Cl. C01g 49/10; B01k 1/00
U.S. Cl. 204—94 4 Claims

Ferrous salt solutions are produced by contacting an aqueous iron salt solution in a reaction vessel with two electrodes, one of which consisting of a layer of mercury and the other of a hydrogen electrode, consisting of a noble-metal conductor along and around which a stream of hydrogen is passed, the two electrodes being connected by means of an electric conductor.

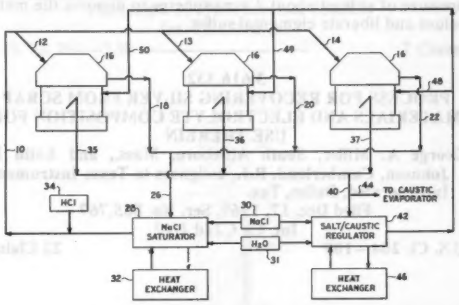


3,616,328

CATHOLYTE RECIRCULATION IN DIAPHRAGM CHLOR-ALKALI CELLS

John E. Currey, Lewiston, and Walter W. Ruthel, Niagara Falls, both of N.Y., assignors to Hooker Chemical Corporation, Niagara Falls, N.Y.

Filed Sept. 23, 1968, Ser. No. 761,752
Int. Cl. C01b 1/06, 1/28; B01k 3/00
U.S. Cl. 204—98 6 Claims



The caustic concentration, and salt-caustic ratio of catholyte is regulated by addition of an alkali metal chloride and/or water to withdrawn cell liquor. The temperature of the cell liquor is regulated as desired and an amount of the idealized cell liquor is returned to the cathode compartment of the cell which is approximately one-third to ten times the volume of catholyte withdrawn in the absence of recirculated catholyte. The cell liquor treatment and recycle may be employed in conjunction with anolyte recycle or as an independent means for cell control. Catholyte recirculation increases the cell efficiency and/or produces a cell liquor with a higher caustic concentration than is obtained conventionally.

3,616,329

ANODE FOR BRINE ELECTROLYSIS

Carl D. Keith, Summit; Alfred J. Haley, Jr., Florham Park, and Robert M. Kero, Cranford, all of N.J., assignors to Engelhard Minerals & Chemical Corporation, Newark, N.J.

Filed Dec. 23, 1968, Ser. No. 786,407
Int. Cl. C01d 1/08
U.S. Cl. 204—99 6 Claims

An improved anode for the electrolysis of brine is comprised of a corrosion resistant valve metal substrate and a thin adherent exterior coating consisting essentially of ruthenium oxide and boron carbide.

3,616,330

PROCESS FOR ELECTROFORMING LOW OXYGEN COPPER

Jerrold R. Denchfield, Canoga Park, Calif., assignor to North American Rockwell Corporation

Continuation of application Ser. No. 650,578, July 3, 1967, now abandoned. This application Jan. 8, 1970, Ser. No. 3,568

Int. Cl. C22d 1/16

U.S. Cl. 204—106 10 Claims

A process for preparing low oxygen copper wherein an electrical current is passed through an aqueous electrolyte containing from 0.001 to 5.0 ounces of a pentose per gallon of aqueous electrolyte and copper having a lower oxygen content than the copper of the anode is deposited at the cathode at a current density of from 20 to 400 amperes per square foot.

3,616,331

RECOVERY OF NICKEL AND COPPER FROM SULFIDES

Charles Edward O'Neill, Oakville, Ontario; Alexander Illis, Mississaugua, Ontario, and David Anthony Huggins, Mississaugua, all of Canada, assignors to The International Nickel Company, Inc., New York, N.Y.

Filed June 23, 1969, Ser. No. 835,797

Claims priority, application Canada, Aug. 3, 1968, 026,644

Int. Cl. C22d 1/10; C22b 23/06, 3/00

U.S. Cl. 204—108 22 Claims

The present invention is directed to the treatment of sulfide materials containing nickel and/or copper sulfide but substantially free of iron to recover the metal values as a sulfate solution and to liberate elemental sulfur wherein the metal sulfide is slurried in an aqueous sulfuric acid-iron sulfate leach solution and is then heated at a temperature range of about 80° C. to 150° C. under an oxygen partial pressure of at least about 2 atmospheres to dissolve the metal values and liberate elemental sulfur.

3,616,332

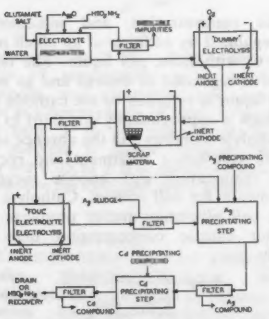
PROCESS FOR RECOVERING SILVER FROM SCRAP MATERIALS AND ELECTROLYTE COMPOSITION FOR USE THEREIN

George A. Miller, South Attleboro, Mass., and Keith N. Johnson, Cumberland, R.I., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 17, 1969, Ser. No. 885,767

Int. Cl. C22d 1/12

U.S. Cl. 204—109 22 Claims



Substantially pure silver is economically and effectively recovered from scrap material, such as scrap material containing silver, silver oxide and other metals such as cadmium, copper, nickel and the like in elemental or combined form, by electrolysis of an aqueous electrolyte solution containing silver sulfamate, a glutamic acid compound such as monosodium glutamate monohydrate and an excess of sulfamic acid. The scrap material itself serves as the anode and fine grained silver is deposited at a cathode of corrosion-resistant material without substantial codeposition of any other metals from the scrap. During electrolysis, silver and any other metals present in the anode scrap material are dissolved electrolytically and the metals in combined form are dissolved chemically in the electrolyte. Because of the high solubility of silver sulfamate in the electrolyte, high current densities on the order of 30 to 300 amperes per square foot may be employed. When substantial quantities of cadmium and metal ions other than silver buildup in the electrolyte, substantially all of the silver therein may be recovered by subjecting the electrolyte to further electrolysis using inert electrodes as the anode and cathode followed by precipitation of the remaining silver as silver chloride or other insoluble silver compound. Cadmium may then be recovered from the resulting electrolyte by precipitation as cadmium hydroxide or other insoluble cadmium compound.

3,616,333

METHOD FOR PRODUCING HALOGENS

John B. Farmakides, 702 6th St. S.W., Washington, D.C.

Continuation-in-part of application Ser. No. 500,236, Oct. 21, 1965, now abandoned. This application Aug. 14, 1969, Ser. No. 850,239

Int. Cl. C01b 7/00; B01j 1/10

U.S. Cl. 204—128 4 Claims

An improvement in the process of converting halide ions to the elemental halogen utilizing the assistance of high-intensity coherent electromagnetic radiation in the form of a laser beam. A solution of the halide ion in an electrochemical cell is electrolyzed and at the same time subjected to irradiation by means of a laser beam. The radiation is of such wavelength that the photons in the radiation are selectively absorbed by the ions in solution and energize them sufficiently to greatly enhance their conversion to the gaseous halogen.

3,616,334

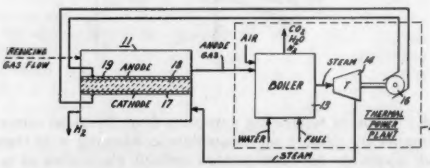
ELECTRICALLY AND CHEMICALLY COUPLED POWER GENERATOR AND HYDROGEN GENERATOR

Walter W. Aker, Schenectady; Dale H. Brown, Scotia; Henry S. Spacil, Schenectady, and Donald W. White, Burnt Hills, all of N.Y., assignors to General Electric Company

Filed July 5, 1968, Ser. No. 742,699

Int. Cl. C01b 13/04

U.S. Cl. 204—129 7 Claims



A solid oxygen-ion electrolyte cell electrically and chemically coupled with a thermal power generator is described wherein the generation of hydrogen is coulometric with respect to current received by the solid oxygen-ion electrolyte cell from the power generator. Hydrocarbon fuel is consumed in the thermal power generator to produce steam and generate electrical power. Both of these products are supplied to the solid oxygen-ion electrolyte cell wherein dissociation of the steam for the generation of hydrogen gas is carried on. A particular application of this invention described is the conversion of coal to ammonia.

3,616,335

ELECTROCHEMICAL METHOD OF GENERATING HYDROGEN

William N. Carson, Jr., Schenectady, and James L. Manganaro, New York, both of N.Y., assignors to General Electric Company

Division of Ser. No. 674,159, Oct. 10, 1967, abandoned. Filed Aug. 21, 1969, Ser. No. 852,049 No. 852,049

Int. Cl. C01b *1/03*; H01m *29/04*

U.S. Cl. 204—129 1 Claim

Method of producing hydrogen which involves a magnesium reactant and an aqueous electrolyte with a dewatering agent, and an electrical energy source in contact with the magnesium reactant and the cathode. The dewatering agent reduces substantially the volume of magnesium hydroxide precipitation within the cell during its operation by freeing water from the precipitate thereby increasing its density.

3,616,336

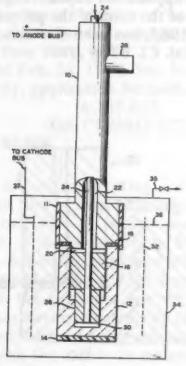
METHOD OF CONDITIONING ANODES

William V. Childs, and Forrest N. Ruehlen, both of Bartlesville, Okla., assignors to Phillips Petroleum Company

Filed May 31, 1968, Ser. No. 733,486

Int. Cl. C23b *1/00*; B01k *3/00*, *1/00*

U.S. Cl. 204—130 17 Claims



Anodes employed in electrolytic cells are conditioned for improved operation by subjecting said anode to an abnormally great current density for a period of time sufficient to deliberately induce anode effect, and then subjecting the anode to an abnormally great voltage for a period of time sufficient to eliminate said anode effect.

3,616,337

ELECTROCHEMICAL RECOVERY OF SULFURIC ACID

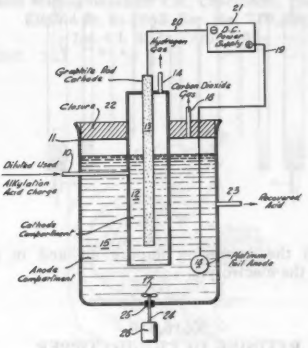
William B. Mather, Jr., Hopewell Junction, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed Aug. 22, 1968, Ser. No. 754,555

Int. Cl. B01k *3/00*

U.S. Cl. 204—130 13 Claims

Electrochemical process for purification and concentration of used sulfuric acid containing hydrocarbon wherein water is added to bring the water content of the acid to between one and two times the stoichiometric amount of water in relation to the amount of carbon present, and electrochemically treating the diluted acid with a current density in the range of 200–2,500 amperes per square foot to cause oxidation of the carbon to carbon dioxide at the anode.



Process is particularly applicable to the recovery of used sulfuric acid alkylation catalyst.

3,616,338

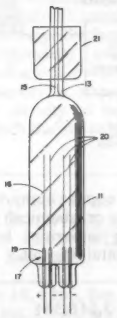
METHOD OF PRODUCING CRYSTALLINE MATERIALS

T. O. Paine, Deputy Administrator of the National Aeronautics and Space Administration with respect to an invention of, and Sam Naiditch, 3638 North Canon Blvd. Altadena, Calif.

Filed Sept. 3, 1968, Ser. No. 756,834

Int. Cl. C01d *7/34*

U.S. Cl. 204—130 7 Claims



A method for the electrodeposition of metal crystals from a dense gaseous electrolyte. A salt of the material to be deposited is dissolved in a suitable solvent and the temperature of the solution raised to at least its critical temperature prior to electrolysis.

3,616,339

PROCESS FOR PURIFYING AIR

William Frank Marzluff, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

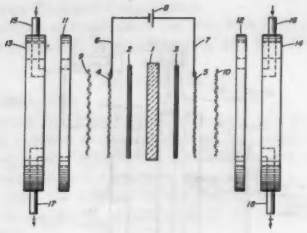
Continuation of application Ser. No. 582,238, Sept. 27, 1966, now abandoned. This application Oct. 17, 1969, Ser. No. 871,727

Int. Cl. B01d *57/00*; B01k *1/00*

U.S. Cl. 204—130 14 Claims

Oxidizable gas impurities in air are removed at the anode of a powered electrochemical cell which comprises an air

cathode, a matrix electrolyte and an anode having a surface of lead dioxide or other metal or metal oxide in direct



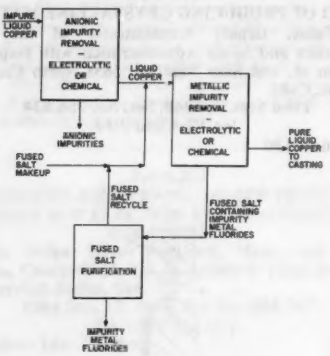
contact with the impinging impure air and in electrical contact with the electrolyte.

3,616,340

REFINING OF LIQUID COPPER

Philip E. Lapat, Sudbury, Mass., assignor to Kennecott Copper Corporation, New York, N.Y.

Filed July 14, 1969, Ser. No. 841,629
Int. Cl. C22d *3/14;* C01b
U.S. Cl. 204—140 22 Claims


IMPURE LIQUID COPPER
ANIONIC IMPURITY REMOVAL — ELECTROLYTIC OR CHEMICAL
LIQUID COPPER
METALLIC IMPURITY REMOVAL — ELECTROLYTIC OR CHEMICAL
ANIONIC IMPURITIES
PURE LIQUID COPPER TO CASTING
FUSED SALT MAKEUP
FUSED SALT RECYCLE
FUSED SALT CONTAINING IMPURITY METAL FLUORIDES
FUSED SALT PURIFICATION
IMPURITY METAL FLUORIDES

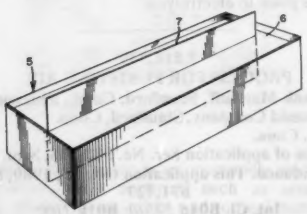
A process for refining copper comprises removing anionic impurities by electrolytic or chemical reaction followed by removing the remaining impurities by contacting molten copper with a fluorine containing salt.

3,616,341

CHEMICAL AND ELECTROPOLISHING

John F. Jumer, 16 West 131 Timber Trails Drive, Elmhurst, Ill.

Filed May 19, 1969, Ser. No. 825,729
Int. Cl. C23b *3/06, 5/68;* C23g *1/36*
U.S. Cl. 204—140.5 11 Claims



Large objects and the interiors of large vessels having areas to be polished which cannot be readily completely subjected to polishing action at one time, may be polished by the improved method on a partial area basis without creating or leaving any noticeable line of demarcation that would indicate that all areas had not been simultaneously subjected to the polishing action.

3,616,342

PROCESS FOR THE REMOVAL OF METAL POWDER AND LOW METAL OXIDES FROM THE SURFACES OF BUNDLES OF WIRE WHICH HAVE BEEN ETCHED WITH SODIUM HYDRIDE

Arnold Lenz, Cologne-Stammheim, and Walter Rogler, Ranzel/Troisdorf, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Dec. 11, 1967, Ser. No. 690,717
Claims priority, application Germany, Dec. 10, 1966, D 51 750
Int. Cl. C10b *1/06*
U.S. Cl. 204—141 7 Claims

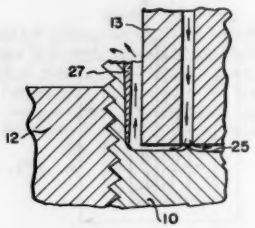
Improvement in the known process for removing rust or scale from metal objects, especially wires, by immersion of the object in caustic soda, caustic potash, or a mixture thereof, followed by inducing an electric current to pass therethrough while maintaining the object in an alkaline medium which improvement involves using lye of at least 60 percent concentration as the alkaline bath and operating at up to about 25° C. over the solidification point of the alkaline bath.

3,616,343

ELECTROCHEMICAL MACHINING METHOD

Kiyoshi Inoue, 100 Sakato, Kawasaki, Kanagawa, Japan

Filed July 28, 1965, Ser. No. 475,375
Claims priority, application Japan, Aug. 8, 1964, 39/45157The portion of the term of the patent subsequent to Dec. 17, 1985, has been disclaimed.
Int. Cl. B23p *1/00*
U.S. Cl. 204—143 M 13 Claims



1. A process for the electrochemical machining of an electrochemically machinable conductive metallic workpiece comprising the steps of:

spacedly juxtaposing said workpiece with an electrochemical-machining electrode having a supporting shank portion and a machining face portion to form a machining gap;

providing an aqueous-electrolyte coolant flow through said gap;

passing an electrical current across said gap;

providing relative movement between said electrode and said workpiece to machine electrolytically a cavity in said workpiece;

shielding the walls of said cavity proximate said shank portion of said electrode by forming in situ in the course of the electrolytic maching of said cavity a sheath of an electrically insulating material to limit further electrolytic action by introducing a substance into said electrolyte coolant capable of forming said sheath; and

preventing formation of said insulating sheath on said workpiece proximate said maching face portion of said electrode by providing periodic spark discharge between said electrode maching face portion and said workpiece.

3,616,344

ELECTROCHEMICAL MACHINING WITH FIRE-RETARDANT SODIUM CHLORATE COMPOSITIONS

John A. Peterson, Niagara Falls, and Theodore H. Dexter, Lewiston, both of N.Y., assignors to Hooker Chemical Corporation, Niagara Falls, N.Y.

Filed Jan. 15, 1968, Ser. No. 697,595
Int. Cl. B23p 1/00
U.S. Cl. 204—143 M 6 Claims

The hexavalent chromium content of aqueous chlorate-containing electrolyte solution employed in electrochemical machining or grinding operations may be reduced through reduction to the trivalent chromium state from which it will precipitate as hydrous chromic oxide or by removal in the hexavalent state by precipitation as a barium, lead, zinc, cobalt or copper salt. The removal of trace hexavalent chromium values from a chlorate-containing electrochemical machining electrolytic solution reduces the fire hazard attending the use of chlorate-containing solutions which may accidentally wet an organic material such as an operator's clothing and subsequently dry to form an extremely combustible mixture. Likewise, the removal of trace hexavalent chromium values from an aqueous chlorate-containing solution reestablishes the flame-retardant activity of an additive such as sodium metasilicate or sodium hydroxide which activity is reduced in the presence of trace hexavalent chromium ions.

3,616,345

METHOD OF MANUFACTURING SEMICONDUCTOR DEVICES IN WHICH A SELECTIVE ELECTROLYTIC ETCHING PROCESS IS USED

Hendrikus Josephus Antonius Van Dijk, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 26, 1968, Ser. No. 708,306
Claims priority, application Netherlands, Feb. 25, 1967, 6,703,013
Int. Cl. H01l 7/52
U.S. Cl. 204—143 GE 7 Claims

A method of manufacturing semiconductor devices comprising a thin film of single crystal silicon. In this process, the surface of one side of a plate-shaped single crystal of silicon substrate of N^+ conductivity having a resistivity not exceeding 0.01 ohm-cm. is provided with at least one zone of epitaxially deposited silicon the thickness of which is small in comparison with the substrate and which forms a boundary with the substrate having a resistivity of at least 0.1 ohm-cm. This body is then subjected to a selective electrolytic etching treatment in which the substrate material is removed at least over a large area, the etching action stopping substantially at the locations at which the material of higher resistivity becomes exposed.

3,616,346

ION-CONTROL METHOD FOR ELECTROCHEMICAL MACHINING

Kiyoshi Inoue, 100 Sakato, Kawasaki, Kanagawa, Japan

Continuation-in-part of application Ser. No. 475,375, July 28, 1965. This application Mar. 19, 1968, Ser. No. 714,251
Claims Priority, application Japan, Mar. 20, 1967, Mar. 28, 1967, Mar. 30, 1967, Mar. 31, 1967, Apr. 18, 1967, 42/17281, 42/19730, 42/20470, 42/20633, and 42/24709
Int. Cl. B23p 1/00
U.S. Cl. 204—143 M 12 Claims

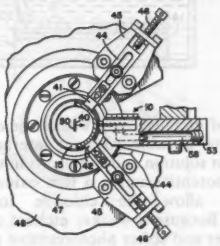
Method of and apparatus for electrochemically machining a workpiece wherein the machining electrolyzing current passes in the form of steep-wavefront pulses on one polarity spaced by intervals and during these intervals, opposite-polarity pulses are applied across the tool electrode and the workpiece with a pulse width at most equal to the duration of the respective interval but preferably of a shorter duration and with an adjustable lag.

3,616,347

METHOD AND APPARATUS FOR ELECTROCHEMICALLY MACHINING ROTATING PARTS

William Andrew Haggerty, Cincinnati, Ohio, assignor to The Cincinnati Milling Machine Co., Cincinnati, Ohio

Filed Apr. 8, 1968, Ser. No. 719,452
Int. Cl. B23p 1/00, 1/02
U.S. Cl. 204—143 16 Claims



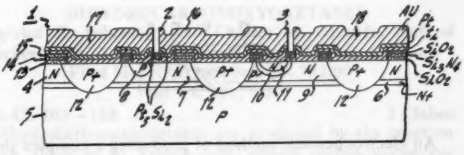
A method and apparatus for electrochemically machining workpieces, to form surfaces of revolution to precise shapes and dimensions, by rotating the workpiece on a pair of shoes engaging the surface being machined. An electrochemical machining tool is positioned between these shoes and adjusted to form a gap of a first predetermined distance into which electrolyte is forced at high velocity to complete an electrical path between the tool and the workpiece. A high-density flow of electrical current, typically 6,000 amperes per square inch, removes material anodically from the workpiece and, as the material is removed, the workpiece becomes smaller in diameter and thus moves toward the tool to decrease the gap distance. The current is maintained at the highest practical level by reducing the voltage as the gap distance decreases. By monitoring the voltage required to maintain the average current constant, the gap dimension can be measured remotely. Surface finishes of less than 5 microinches are obtainable using this process. The appearance of the surface of a workpiece electrochemically machined in this manner is improved in some cases by reducing the current density to between 1,500 and 3,000 amperes per square inch during at least the last revolution of the workpiece.

3,616,348

PROCESS FOR ISOLATING SEMICONDUCTOR ELEMENTS

William J. Greig, Somerville, N.J., assignor to RCA Corporation

Filed June 10, 1968, Ser. No. 735,642
Int. Cl. B23p 1/00
U.S. Cl. 204—143 R 13 Claims



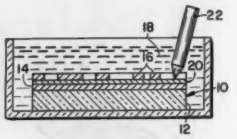
In the manufacture of beam lead integrated circuits or discrete devices, each operating semiconductor portion of one conductivity type is surrounded by substrate material of opposite conductivity type. The substrate material is removed by a preferential electrolytic etching process to provide isolation between each of the semiconductor-operating portions.

3,616,349

METHOD FOR ETCHING CHROMIUM OXIDE FILMS

Raymond E. Szupillo, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed July 30, 1968, Ser. No. 748,676
Int. Cl. B23p 1/00
U.S. Cl. 204—143 13 Claims



A method of etching using weaker acid etchant solutions than heretofore possible wherein interaction between the chloride ions in solution and the film is initiated by producing an electrical potential across a thin oxide layer on the film sufficient to allow the chloride ions to permeate therethrough. Because a weaker etchant can be used in the process, thinner and softer photoresistive protective coatings can also be used for obtaining decorative film patterns, microcircuit masks, and the like. Further, the rate at which etching proceeds can now be controlled over a wider range than heretofore possible, thus effecting the amount of undercutting of the acid-resistant mask by the etchant.

3,616,350

ELECTROCHEMICAL MACHINING ELECTROLYTE

Jacob B. Darling, Carmel, Ind., and Mitchell A. LaBoda, Detroit, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 7, 1968, Ser. No. 750,772
Int. Cl. B23p 1/00
U.S. Cl. 204—143 3 Claims

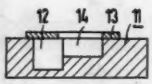
Hygroscopic additives for sodium and potassium chlorate and perchlorate electrochemical machining electrolytes. These additives have a fire-retardant effect on combustibles exposed to electrolyte splash. When used in conjunction with relative humidities of above about 35 percent, the additives prevent the electrolyte splash from drying sufficiently to support combustion. Specific materials which are compatible with the electrolyte are disclosed.

3,616,351

METHOD OF PRODUCING COMPLEX SHAPES, CUTOUTS, HOLES, CAVITIES, EXCAVATIONS AND THE LIKE IN A WORKPIECE

Karl-Georg Gunther, Boxdorf; Gustav Stark, Nurnberg, and Klaus Otto, Nurnberg, all of Germany, assignors to Siemens-Schuckertwerk Aktiengesellschaft, Berlin, Germany

Continuation of application Ser. No. 534,833, Mar. 16, 1966, now abandoned. This application Dec. 15, 1969, Ser. No. 882,360
Int. Cl. B23p 1/00
U.S. Cl. 204—143 M 3 Claims



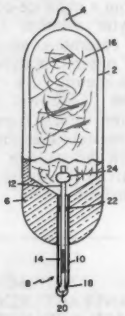
An electrochemical method of producing a complex shape in a workpiece by utilizing a shaping tool supplied with an electrolytic solution as the cathode and the workpiece as the anode. A first cathode of a first simple geometric configuration is positioned in operative proximity with the workpiece and is used to electrochemically form a first cavity of simple geometric configuration in the workpiece. A cover is then placed over the first cavity and a second cathode of a second simple geometric shape is then placed in operative proximity with cover and workpiece. The second cathode is used to electrochemically form along a common axis an opening in the cover and a second cavity of simple geometric configuration in overlapping relation to the first cavity in the workpiece, whereupon, the cover is removed.

3,616,352

FULMINATING MATERIAL APPLICATION TECHNIQUE

Stephen V. Brown, and William C. Fink, both of Williamsport, Pa., assignors to Sylvania Electric Products Inc.

Filed Dec. 22, 1969, Ser. No. 886,999
Int. Cl. B01k 1/00
U.S. Cl. 204—146 7 Claims



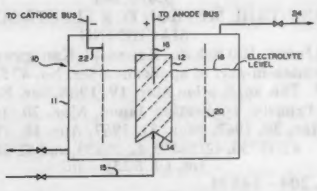
A method of providing the primer anvil wire of a percussive-type photoflash lamp with a coating of a fulminating material in which the anvil wire is dipped into a body of fulminating material to a predetermined depth to provide a coating thereof on the anvil wire extending along its length a predetermined distance from one end thereof, the coating is dried and then the coating is electrochemically stripped from a segment of the wire extending from the coated end thereof to thereby provide an anvil wire having a coating of fulminating material disposed on a segment of predetermined length located intermediate the ends thereof.

3,616,353

MAINTAINING ELECTROLYTIC CELL IN STANDBY CONDITION

William V. Childs, and Forrest N. Ruehlen, both of Bartlesville, Okla., assignors to Phillips Petroleum Company

Filed Jan. 3, 1969, Ser. No. 788,853
Int. Cl. B01k 3/00
U.S. Cl. 204—147 9 Claims



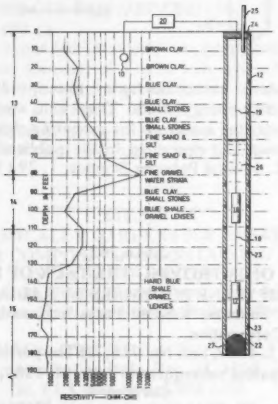
An electrolytic cell wherein a porous electrode is employed is maintained in a standby condition during periods when the cell is not in operation by maintaining a small but effective flow of electric current through said cell during said periods the cell is not in operation. Said small flow of electric current is sufficient to substantially reduce invasion of said porous electrode by the electrolyte contained in the cell.

3,616,354

METHOD FOR INSTALLING CATHODIC PROTECTION

Gordon Ian Russell, 442 Indian Road, Burlington, Ontario, Canada

Continuation-in-part of application Ser. No. 448,334, Apr. 15, 1965, abandoned.
Filed Aug. 18, 1969, Ser. No. 850,741
Int. Cl. C23f *13/00*
U.S. Cl. 204—147 12 Claims



A method for providing cathodic protection for a metallic structure in contact with the ground, for example, a pipeline, comprises disposing a suitable anode at depth in a borehole so that the anode is disposed generally opposite a preselected ground zone or stratum of relatively low electrical resistivity. A liquid electrolyte which is operatively compatible with both the surrounding ground and with the anode is provided in the borehole and may comprise naturally occurring ground water which may optionally be modified, for example, by the addition of an ionizable salt.

3,616,355

METHOD OF GENERATING ENHANCED BIOCIDAL ACTIVITY IN THE ELECTROYLSIS OF CHLORINE CONTAINING SOLUTIONS AND THE RESULTING SOLUTIONS

Ross M. Gwynn, and Tim Themy, both of Carmichael, Calif., assignors to KDI Chloro Guard Corporation

Filed Aug. 5, 1968, Ser. No. 750,017
Int. Cl. C01b *13/04*
U.S. Cl. 204—149 13 Claims

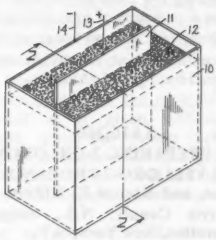
An aqueous medium or dilute brine containing about 10 p.p.m. to 21,000 p.p.m. of chloride ion, and essentially free of other halogen, is electrolyzed between spaced electrodes, with the exposed surface of at least the anode being a continuous surface of a platinum metal, at a minimum potential in the general range of about 10 volts for a 21,000 p.p.m. medium to 100 volts for a 10 p.p.m. medium, and current density below about 5 amps per square inch of electrode surface, with the effluent medium at a temperature in the range of about 55° to 95° F. and preferably about 60° to 75° F., and at a pH within the range 6 to 8.5 to thereby generate in said medium chlorine together with free radicals and other oxidizing species including ozone, said ozone being present in an amount to provide at least one part by weight of ozone to each 50 parts by weight of available chlorine in said effluent. Narrowing the pH range, adjusting the effluent temperature and increasing the voltage may increase the proportion of ozone. At a pH of 7 to 8, a temperature in excess of 60° F., and a potential about 25 percent above the minimum for a particular chloride ion concentration, the proportion of ozone to chlorine is generally in excess of one part ozone to 20 parts chlorine; and at a pH of 7.2–7.8, a temperature in excess of about 66° F. and a potential about 50 percent above said minimum this proportion may be as high as one part ozone to five or ten parts chlorine. Chloride is suitably supplied as NaCl solution in varying concentrations in the fractional normality range, preferably about 0.003 N to 0.6 N corresponding with about 10 p.p.m. to 21,000 p.p.m. of chloride ion.

3,616,356

ELECTROLYSIS IN A PARTICULATE CARBON PACKING

Clarence H. Roy, 97 Dorman Road, Oxford, Conn.

Filed Sept. 18, 1967, Ser. No. 668,427
Int. Cl. C02b *1/82*; B01d *43/00*
U.S. Cl. 204—152 21 Claims



This invention relates to the electrolytic treatment of water containing dissolved salts by means of a cell in which the anode and the cathode are separated by a particulate carbon packing. The electrolytic process precipitates metallic impurities as metal oxides, hydroxides, sulfides, etc., which may be filtered from the cell effluent and liberates gases as such. Process and apparatus serve for the purification of water and recovery of impurities.

3,616,357

METHOD OF MODIFICATION OF THE COLOR OF GEMS

John C. Haynes, 12 E. Park Place, Newark, Ohio

Filed May 31, 1968, Ser. No. 733,274
Int. Cl. B01j *1/10*
U.S. Cl. 204—157.1 H 12 Claims

An improved method of producing gems of changed color wherein the gems are placed in contact with a particulate radioactive material. Radioactive contamination of the gem is effectively removed by immersion in a liquid bath which dissolves the attachment of radioactive solids to the gems, and acid is a preferred liquid. Preferably the irradiated gems are first subjected to a mild abrasive action to remove most of the radioactive material. The irradiation, abraiding, and dissolving steps are preferably all done in a single generally airtight enclosure.

3,616,358

PHOTOSYNTHESIS OF DIHYDROCARBONOXYOXETANES

Siegfried H. Schroeter, and Charles M. Orlando, both of Schenectady, N.Y., assignors to General Electric Company

Filed May 29, 1968, Ser. No. 732,901
Int. Cl. B01j *1/10*
U.S. Cl. 204—158 2 Claims

Dihydrocarbonoxyoxetanes are produced by the reaction of an aldehyde or ketone with ketene acetals under the influence of ultraviolet light. The dihydrocarbonoxyoxetanes produced in accordance with this invention are useful as solvents for chemical reactions and as monomers which can be polymerized to polyoxyalkylene compounds employing, for example, trialkylaluminum compounds with water in accordance with known processes. The polyoxyalkylene compounds are useful as coating materials, lubricants, as wire insulation, etc.

3,616,359

PROCESS FOR PREPARING NITROSO HALOCARBONS

John E. Paustian, Whippany, and Herman Burwasser, Vestal, both of N.Y., assignors to Thiokol Chemcial Corporation, Bristol, Pa.

Filed Aug. 20, 1968, Ser. No. 753,863
Int. Cl. B01j 1/10
U.S. Cl. 204—158 R 2 Claims

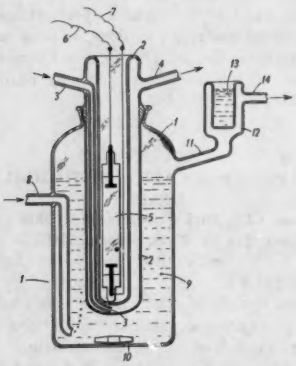
A process has been provided for preparing perhalo nitroso alkanes from a halocarbon compound of the formula RCX_2H wherein X is fluorine, chlorine, or bromine and R is a halogen or a perhalo radical and wherein the halogens substituents are fluorine, chlorine, or bromine. The process is carried out by reacting the halocarbon with nitrosyl chloride in a vapor phase at a pressure of one atmosphere or less and at a temperature from 160° C. and lower while irradiating the reaction mixture with radiant energy at the characteristic wavelength displayed by nitrosyl chloride.

3,616,360

PROCESS FOR PREPARING 2-CHLOROMETHYL-1,3-POLYFLUORO-2-PROPANOLS

Robert E. A. Dear, and Everett E. Gilbert, both of Morris Township, Morris County, N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed May 20, 1969, Ser. No. 826,127
Int. Cl. B01j 1/10
U.S. Cl. 204—158 HA 6 Claims



Preparation of 2-chloromethyl-1,3-polyfluoro-2-propanols by subjecting a mixture of a 2-methyl-1,3-polyfluoro-2-propanol, or a 2-(mono or dichloromethyl)-1,3-polyfluoro-2-propanol and chlorine to the action of a broadband of ultraviolet light in the wavelength range between about 2,000° A. and about 3,600° A. at a temperature between about 10° C. and about 200° C. The resulting compounds and their fluorinated derivatives are useful as fumigants against insects.

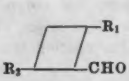
3,616,361

PHOTOCHEMICAL METHOD OF PREPARING CYCLOBUTANE CARBOXALDEHYDES

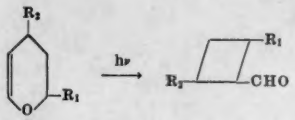
Jane M. Picone, Peekskill, and Rangaswamy Srinivasan, Ossining, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 28, 1969, Ser. No. 845,560
Int. Cl. B01j 1/10
U.S. Cl. 204—158 9 Claims

Cyclobutane carboxaldehydes having the general formula:



where R_1 and R_2 can be H, CH_3, OC_2H_5 and CHO, are prepared from a 3,4 dihydro-[2H]-pyran and its derivatives. A pyran derivative is exposed to actinic radiation for a time sufficient to cause the photoisomerization thereof into the corresponding cyclobutane carboxaldehydes. The reaction may be characterized as:



the cyclobutane carboxaldehydes thus produced can be utilized as high-energy fuels. They can also be used as monomeric starting materials for preparing rigid polymers of the type shown and described in the publication to W. W. Moyes, et al., Journal Polymer Science, 1, 29 (1963).

3,616,362

METHOD OF IMPROVING THE TACK OF ETHYLENE-PROPYLENE POLYMERS BY RADIATION

Anthony C. Soldatos, Kendall Park, N.J., assignor to Union Carbide Corporation

Filed Apr. 2, 1968, Ser. No. 718,225The portion of the term of the patent subsequent to June 14, 1983, has been disclaimed.
Int. Cl. B01j 1/00; C07f 9/02; C08f 29/2
U.S. Cl. 204—159.14 25 Claims

This invention relates to a method of improving the tack of ethylene-propylene polymers in a relatively short period of time by adding thereto a polymeric phenolic tackifier and exposing the resultant compositions to ionizing radiation or nonionizing radiation.

3,616,363

PHOTOLYTIC CROSS-LINKING OF OLEFINIC HYDROCARBON CONTAINING CARBOXYLIC ACID COPOLYMERS

Alwin S. Milian, Jr., Lancaster Village, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed May 17, 1968, Ser. No. 729,888
Int. Cl. B01j 1/00; C08d 1/00
U.S. Cl. 204—159.14 2 Claims

Cross-linking olefinic hydrocarbon containing carboxylic acid polymers by use of ultraviolet light of a wavelength of less than 2,900 A. The carboxylic acid may be present as units in the olefinic polymer, or as free unpolymerized carboxylic acid, or as polymerized units blended with the olefinic polymer. The copolymer may be partially neutralized, but must contain at least 0.5 mole percent unneutralized acid.

3,616,364

PROCESS OF TREATING RADIATION-SENSITIVE POLYMERS

Gaetano F. D'Alelio, South Bend, Ind., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of application Ser. No. 581,688, Sept. 26, 1966.
This application Apr. 8, 1969, Ser. No. 814,430
Int. Cl. B01j 1/10; C08f 1/24
U.S. Cl. 204—159.14 10 Claims

The preparation of highly radiation-sensitive cross-linkable polymers whereby said polymers are treated by subjecting same to high-energy ionizing irradiation so as to produce three-dimensional cross-linked, insoluble, infusible polymers at relatively low doses of ionizing irradiation.

3,616,365

PROCESS OF MAKING PARTICULATE EXPANDED OLEFIN POLYMERS HAVING HIGH THERMAL STABILITY

Fritz Stastny, Ludwigshafen/Rhein; Rudolf Gaeth, Limburgerhof/Pfalz, and Hans-Georg Trieschmann, Hambach/Weinstrasse, all of Germany, assignors to Badische Anilin & Soda Fabrik Aktiengesellschaft, Ludwigshafen/Rhineland Pfalz, Germany

Continuation of application Ser. No. 640,509, May 23, 1967, now abandoned. This application Sept. 22, 1969, Ser. No. 860,107

Int. Cl. B01j *1/10;* C08j *1/30*

U.S. Cl. 204—159.14 5 Claims

Particulate expanded ethylene or propylene polymers having a particle diameter of 3 to 50 mm. and a bulk density of 5 to 200 grams/liter and a gel content of 10 to 85 percent by weight; and a method for the production of such expanded ethylene or propylene polymer particles in which the particles are treated with high energy radiation.

3,616,366

PHOTOCEHMICALLY HARDENABLE UNSATURATED POLYESTER COMPOSITIONS CONTAINING A NOVEL STABILIZER SYSTEM

Beppino Passalenti; Silvio Vargiu, and Ugo Nistri, all of Milan, Italy, assignors to Societa Italiaya Resine S.p.A., Milan, Italy

Filed Dec. 29, 1969, Ser. No. 888,834

Claims priority, application Italy, Dec. 31, 1968, 25745 A/68

Int. Cl. C08d *1/00;* C08f *1/00*

U.S. Cl. 204—159.15 9 Claims

Stable, photochemically hardenable unsaturated polyester compositions containing an alkyl or aryl phosphite, a quaternary ammonium compound and an organic sulphonyl halide.

3,616,367

PHOTOPOLYMERIZABLE ACRYLIC COMPOSITIONS CONTAINING REARRANGEABLE ULTRAVIOLET STABILIZER PRECURSORS

David William Zunker, Vienna, W. Va., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 25, 1968, Ser. No. 778,827

Int. Cl. C08f *45/58;* C08g *51/58*

U.S. Cl. 204—159.16 8 Claims

A photopolymerizable composition containing monomeric and polymeric esters of an acid selected from the group consisting of acrylic acid and methacrylic acid, 50 to 1,000 parts per million of a photopolymerization initiator, 5 to 100 parts per million of polymerization inhibitor, and 0.001 percent to 5.0 percent of an ultraviolet stabilizer precursor which is a phenolic ester.

3,616,368

METHOD FOR THE RADIATION POLYMERIZATION OF POLYOXYMETHYLENE

Isao Ishigaki, Takasaki-shi; Akihiko Ito, Takasaki-shi, and Tadashi Iwai, Miura-Gun, all of Japan, assignors to Japan Atomic Energy Research Institute

Filed May 7, 1969, Ser. No. 822,721

Claims priority, application Japan, May 20, 1968, 43/33869

Int. Cl. C08f *3/40;* C08d *1/00;* C08f *1/16*

U.S. Cl. 204—159.21 10 Claims

Polyoxymethylenes are obtained by first irradiating trioxane and/or tetraoxane with ionizing radiation, then contacting the irradiated trioxane and/or tetraoxane with nonirradiated trioxane and/or tetraoxane, and then maintaining the resulted mixture under the polymerizing condition to thereby effect polymerization of the whole system including the nonirradiated trioxane and/or tetraoxane by the action of active species formed in the irradiated trioxane and/or tetraoxane to give polyoxymethylenes readily with a minimum dosage required for such irradiation.

3,616,369

RADIATION-INDUCED IONIC POLYMERIZATION CONTROLLED BY THE PRESENCE OF LEWIS ACIDS OR LEWIS BASES

Thomas F. Williams, Knoxville, Tenn., assignor to The United States of America as represented by the United States Atomic Energy Commission

Continuation-in-part of application Ser. No. 324,146, Nov. 15, 1963, now abandoned. This application Nov. 9, 1967, Ser. No. 687,410

Int. Cl. B01j *1/00;* C08d *1/00;* B01f *11/00*

U.S. Cl. 204—159.22 2 Claims

This invention relates to a method for controlling the molecular weight of a polymer derived from an ethylenically unsaturated monomer which can be catalyzed to polymerize by a Lewis acid, which comprises mixing said monomer with a Lewis base soluble in said monomer, and then reacting the mixture with an amount of high-energy radiation at least sufficient to initate and propagate polymerization of said monomer, said Lewis base being selected from the class which functions to determine the molecular weight of the polymer produced at a given radiation dosage and temperature, said monomer being selected from an ethylenically unsaturated monomer having electron-releasing groups attached directly or indirectly to the ethylenic linkage of said monomer which impart a Lewis base character to said monomer.

The invention is also applicable to controlling the molecular weight of a polymer derived from a monomer which can be catalyzed by a Lewis base. In that case, the molecular weight of the final polymer can be controlled by mixing the monomer with a Lewis acid and then irradiating the mixture at a given temperature and to a given radiation dosage.

3,616,370

CROSSLINKING OF UNSATURATED POLYESTERS WITH N-3-OXOHYDROCARBON-SUBSTITUTED ACRYLAMIDES

Thomas C. Jennings, Willowick, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Continuation-in-part of application Ser. No. 801,794, Feb. 24, 1969, now abandoned , Continuation-in-part of application Ser. No. 877,041, Nov. 14, 1969, now abandoned. This application Jan. 22, 1970, Ser. No. 5,105

Int. Cl. C08f *21/00, 21/02*

U.S. Cl. 204—159.15 13 Claims

N-3-Oxohydrocarbon-substituted acrylamides, especially diacetone acrylamide, are used as cross-linking monomers for unsaturated polyesters, either alone or in combination with known cross-linking monomers such as styrene and diallyl phthalate. The curable compositions thus formed may be used in the preparation of nonblocking "prepregs" which, upon stacking and molding, form laminates with excellent properties. They are also suitable for forming physically or chemically thickened premixes. In the chemically thickened ones, which employ a metal salt or hydroxide as a reactive thickener, an acidic reagent (usually a polymerizable acid such as methacrylic acid) may be used to accelerate B-stage resin formation.

3,616,371

PROCESS FOR THE PRODUCTION OF HOMOPOLYMER OF VINYLIDENE FLUORIDE OR COPOLYMERS THEREOF IN THE PRESENCE OF A FLUORINE-CONTAINING HYDROCARBON SOLVENT

Hiroshi Ukihashi, Tokyo, and Masahiko Ichimura, Yokohama-shi, both of Japan, assignors to Asahi Glass Company, Ltd., Chiyoda-ku, Tokyo, Japan

Filed June 17, 1968, Ser. No. 737,336

Claims priority, application Japan, Aug. 5, 1967, 42/50212

Int. Cl. B01j *1/00;* C08d *1/00*

U.S. Cl. 204—159.22 17 Claims

Process for homopolymerizing vinylidene fluoride or copolymerizing it with at least one other polymerizable compound such as hexafluoropropylene, chlorotrifluoroethylene, vinyl chloride or the like, characterized by the fact that the polymerization reaction is carried out mainly in the liquid phase in a condensed system

containing the material to be polymerized and a fluorine-containing hydrocarbon solvent such as trichlorotrifluoroethanes, octafluorocyclobutane or the like, by the irradiation of ionizing radiation.

3,616,372

PHOTOCHEMICAL SYNTHESIS OF CIS- AND TRANS-OCIMENE

Paul J. Kropp, and William F. Erman, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 22, 1968, Ser. No. 715,163
Int. Cl. B01j *1/10*
U.S. Cl. 204—162 R **3 Claims**

A process for the preparation of cis- and trans-ocimene by ultraviolet irradiation of αpinene in a photosensitizing medium to accomplish said ultraviolet transformation. The products of the process are useful as perfume components.

3,616,373

FREE RADICAL PRODUCTION OF 1,2 VINYL DISULPHIDES FROM ORGANIC DISULFIDES

El-Ahmadi I. Heiba, Mercer County, N.J., assignor to Mobil Oil Corporation

Filed June 7, 1968, Ser. No. 735,177
Int. Cl. B01j *1/10*; C07c *149/00*
U.S. Cl. 204—162 R **21 Claims**

A process is described for preparing 1,2-vinyl disulfides by reacting an unsaturated compound selected from acetylenes and allenes with an organic disulfide in the presence of a free radical generator.

3,616,374

α-LIMONENE DIMERCAPTAN PROCESS

Roland Henry Goshorn, Fort Washington, and Paul Daniel Morton, Malvern, both of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed Sept. 24, 1969, Ser. No. 862,159
Int. Cl. B01j *1/10*
U.S. Cl. 204—162 R **2 Claims**

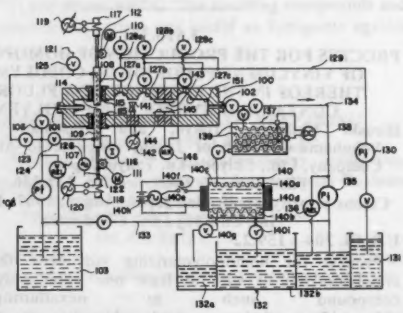
A continuous process for preparing d-limonene dimercaptan by exposing a continuously flowing liquid mixture of d-limonene and hydrogen sulfide to ultraviolet light at a temperature between about 0° C. and about 25° C., at a pressure between 175 to 250 p.s.i.g., said mixture of hydrogen sulfide and d-limonene being at a mole ratio of from between about 10:1 to about 25:1.

3,616,375

METHOD EMPLOYING WAVE ENERGY FOR THE EXTRACTION OF SULFUR FROM PETROLEUM AND THE LIKE

Kiyoshi Inoue, 100 Sakato Kawasaki, Kanagawa, Tokyo, Japan

Filed Feb. 3, 1967, Ser. No. 613,791
Claims priority, application Japan, Mar. 3, 1966, 41/12963
Int. Cl. B01j *1/10, 1/12*
U.S. Cl. 204—162 R **14 Claims**



A method of decreasing the sulfur content of crude oil and other petroleum products in which the sulfur is present in an elemental state or in chemical combination with an organic substance (i.e., the crude oil), in which high-energy activation at relatively low temperatures ruptures carbon-sulfur bonds of the molecules and effectively forms hydrogen-sulfur bonds in the form of H_2S or carbon-sulfur bonds as CS_2, etc. so that gaseous sulfur-containing compounds are evolved from the liquid. The periodic high energy can be an impulsive spark discharge alone or accompanied by vibrational shock of sonic or ultrasonic frequency; laser activation with or without sonic waves of a frequency facilitating the rupture of the bonds to produce gaseous sulfur-containing compounds is also suitable. The apparatus includes an activation chamber through which the crude oil is pumped while being transported aboard a tanker or the like, means for recovering or discharging the gases, and one or more sulfur-removing devices such as a spark-discharge electrode assembly, cavitation generator, ultrasonic or sonic transducer, shock wave generator, high frequency electrode assembly, laser or microwave generator.

3,616,376

PREPARATION OF 1-HEPTANAMIDE USING HIGH-ENERGY IONIZING RADIATION

Nelson S. Marans, 12120 Kerwood Road, Silver Spring, Md., and Donald P. Gush, 1811 Kanawha St., Hyattsville, Md.

Continuation-in-part of application Ser. No. 535,013, Mar. 17, 1966, now abandoned. This application Sept. 13, 1968, Ser. No. 759,778
Int. Cl. B01j *1/10*
U.S. Cl. 204—162 **9 Claims**

In abstract, this invention is directed to a process for preparing 1-heptanamide by irradiating a first liquid system with free radical-inducing radiation in the substantial absence of oxygen, the first liquid system being selected from the group consisting of; (i) a first composition consisting essentially of about 50–99.9 parts formamide, about 0–50 parts 1-heptanamide, and 1-hexene; and (ii) a second composition consisting essentially of about 50–99.8 parts formamide, about 0.1–5 parts acetone, about 0–45 parts 1-heptanamide, and 1-hexene, the mole ratio of 1-hexene:formamide in the first liquid solution being about 1:300–2,000, separating, and recovering the thus formed 1-heptanamide, all as recited hereinafter.

3,616,377

PROCESS FOR THE PREPARATION OF OXETANES AND DERIVATIVES THEREOF BY PHOTOCYCLO ADDITION

Donald R. Arnold, Lincolndale, N.Y., and Anthony A. Sousa, Raleigh, N.C., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 536,662, Mar. 23, 1966, Pat. No. 3,418,330, which is a continuation-in-part of application Ser. No. 324,183, Nov. 18, 1963, now abandoned. Filed June 25, 1969, Ser. No. 836,639
Int. Cl. B01j *1/10*
U.S. Cl. 204—162 R **5 Claims**

Oxetanes, such as the 3-oxatricyclo [4.2.1.0] nonanes, are prepared by the photocatalyzed reaction of a ketone with an olefinic compound. The reaction is carried out by bringing the ketone and the olefinic compound into admixture in a suitable reactor and irradiating the mixture with light energy.

3,616,378

HIGH-PRESSURE RADIOLYTIC OXIDATION OF CYCLOHEXANE

Forrest N. Case, Oak Ridge; David E. Smiley, Knoxville, and Donald L. Kau, Rockwood, all of Tenn., assignors to The United States of America as represented by the United States Atomic Energy Commission

Filed Sept. 9, 1969, Ser. No. 856,464
Int. Cl. B01j *1/10*
U.S. Cl. 204—162 HE **1 Claim**

This invention relates to a method for converting cyclohexane to cyclohexanone which comprises irradiating said cyclohexane with penetrative ionizing radiation at an oxygen pressure which results in a cyclohexanone-to-cyclohexanol product ratio greater than 1.

3,616,379

CHLOROBROMINATION OF BENZENE IN THE PRESENCE OF HIGH ENERGY RADIATION

David E. Harmer, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jan. 11, 1968, Ser. No. 696,983
Int. Cl. B01j 1/10
U.S. Cl. 204—163 11 Claims

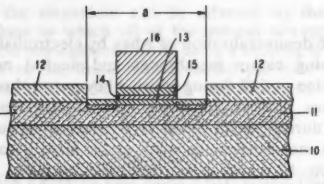
Chlorobromination of benzene to produce principally 1-chloro-2,3,4,5,6-pentabromocyclohexane is accomplished by a process comprising contacting chlorine, bromine and benzene in the presence of high energy radiation.

3,616,380

BARRIER LAYER DEVICES AND METHODS FOR THEIR MANUFACTURE

Martin P. Lepselter, New Providence, and Joseph R. Ligenza, Califon, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 22, 1968, Ser. No. 778,099
Int. Cl. B01k 1/00
U.S. Cl. 204—164 3 Claims



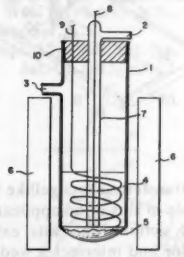
The specification describes an improved barrier layer device which utilizes an oxide guard ring around the barrier layer. An insulating guard ring is shown to be superior to the PN junction guard ring of the prior art. Manufacturing methods for forming oxide guard rings are also discussed. These involve forming the oxide layer by exposure to an oxygen plasma.

3,616,381

DEHYDROGENATION OF HYDROCARBONS IN AN ELECTRIC FIELD

Leonard D. Krenzke, Riverdale, and Glenn O. Michaels, South Holland, both of Ill., assignors to Atlantic Richfield Company, New York, N.Y.

Filed Aug. 26, 1969, Ser. No. 853,033
Int. Cl. C07b 29/06; B01k 1/00
U.S. Cl. 204—168 11 Claims



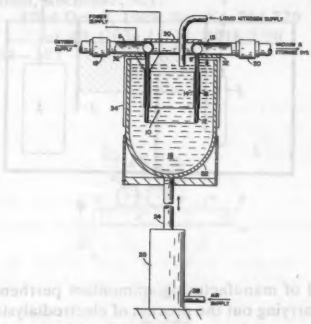
An improvement in a process for the catalytic dehydrogenation of dehydrogenatable hydrocarbon feedstocks to form compounds having a higher carbon to hydrogen ratio is disclosed. The process is carried out while subjecting the solid catalyst, which contains a group VIb metal oxide, to a high-voltage electrical field of at least about 1000 volts/cm.

3,616,382

PROCESS FOR MAKING OZONE

Ervin R. Bartle, Jr., San Diego; Paul R. Erickson, El Cajon; Edgar A. Meckstroth, La Mesa, and Benjamin F. Myers, Jr., San Diego, all of Calif., assignors to The United States of America as represented by the Secretary of the Army

Division of Ser. No. 659,569, Aug. 8, 1967, Pat. No. 3,511,780.
Filed Nov. 4, 1969, Ser. No. 871,115
Int. Cl. C01b 13/10, 13/12
U.S. Cl. 204—176 3 Claims



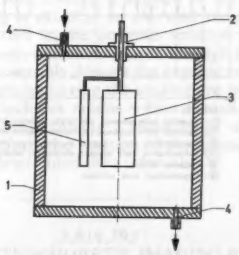
A novel process and apparatus for synthesizing high-purity ozone (or for preparing test gas mixtures containing ozone). The process involves containing liquid nitrogen inside a vacuum dewar, supporting a dielectric ozonizer in the liquid nitrogen, evacuating the ozonizer to a low vacuum through a vacuum outlet, closing the vacuum outlet of the ozonizer, introducing high-purity oxygen into the ozonizer through an inlet, closing the inlet, applying a source of high-discharge alternating voltage across metal electrodes and oxygen therebetween, and removing the ozone thereby formed. The product is high-purity ozone. The apparatus comprises a two-walled annular ozonizer of Pyrex glass with electrodes secured onto the outer and inner surfaces.

3,616,383

METHOD OF IONITRIDING OBJECTS MADE OF HIGH-ALLOYED, PARTICULARLY STAINLESS, IRON AND STEEL

Josef Klauesler, Cologne, Germany, assignor to Elektrophysikalische Anstalt Bernhard Berghaus, Vaduz, Liechtenstein, Germany

Filed Oct. 25, 1968, Ser. No. 770,601
Int. Cl. C23b 11/00; B01k 1/00
U.S. Cl. 204—177 1 Claim

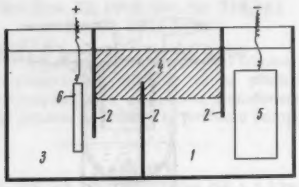


Nitrogen hardening of workpieces of stainless and acid resistant chrome and chrome-nickel steels, in a glow discharge in a gas, is enhanced by enriching the gas atmosphere with iron. The enriching is done by atomizing iron from a separate electrode arranged in the glow discharge.

3,616,384
METHOD FOR THE PRODUCTION OF AMMONIUM PERRHENATE

Yan Karlovich Litsis, ulitsa Lachplesha, 70a, kv. 14, and Bruno Andreevich Purin, ulitsa Vilisa Latsisa, 2a, kv. 11, both of Riga, U.S.S.R.

Filed Nov. 3, 1969, Ser. No. 873,397
Int. Cl. B01d 13/02
U.S. Cl. 204—180 P 1 Claim

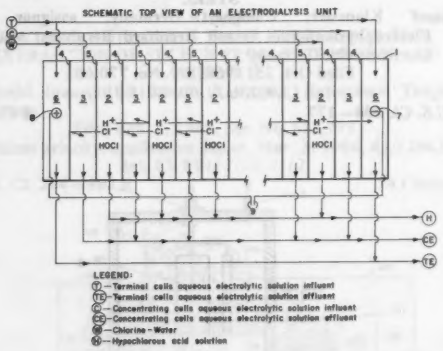


A method of manufacturing ammonium perrhenate which comprises carrying out the process of electrodialysis in a two-chamber electrodialysis apparatus furnished with a liquid diaphragm consisting of amyl, hexyl or heptyl alcohol, wherein the starting catholyte is a perrhenate ion-containing acidic solution and the starting anolyte consists of a 10–30 percent solution of ammonia, while the liquid diaphragm contains 0.05–0.1 percent by weight of 8-mercaptoquinoline.

3,616,385
CHLORINE- AND CHLORIDE-FREE HYPROCHLOROUS ACID BY ELECTRODIALYSIS

Richard K. Kloss, Forest Park; Gene W. Claybaugh, Green Township, Hamilton County, and David D. Whyte, Wyoming, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed July 23, 1969, Ser. No. 844,113
Int. Cl. B01d 13/02
U.S. Cl. 204—180 P 10 Claims

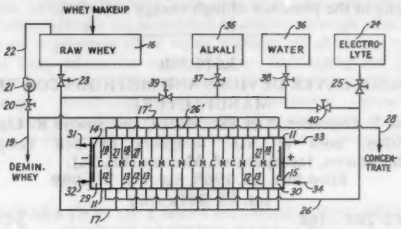

SCHEMATIC TOP VIEW OF AN ELECTRODIALYSIS UNIT
HOCl
LEGEND:
(T)—Terminal cells aqueous electrolytic solution influent
(TE)—Terminal cells aqueous electrolytic solution effluent
(C)—Concentrating cells aqueous electrolytic solution influent
(CE)—Concentrating cells aqueous electrolytic solution effluent
(W)—Chlorine-Water
(H)—Hypochlorous acid solution

An essentially chlorine- and chloride-free aqueous solution of hypochlorous acid is prepared from chlorine water by an electrodialysis process which employs ion-selective, semipermeable membranes; a chlorine water pH of from about 2.75 to about 7.5 is preferred to achieve maximum efficiency of the process.

3,616,386
ELECTRODIALYTIC DEMINERALIZATION OF WHEY USING NEUTRAL MEMBRANES

John R. Scheder, Horicon, Wis., assignor to Purity Electrochemical Company, Mayville, Wis.

Filed Aug. 8, 1969, Ser. No. 848,643
Int. Cl. B01d 13/02
U.S. Cl. 204—180 P 4 Claims

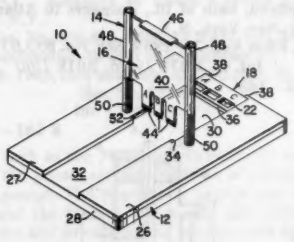


In the demineralization of whey by electrodialysis in a cell comprising cation membranes and neutral membranes a production period during which whey passes through the cell alternates with a sterilizing and membrane-regenerating period during which alkali is conducted through the cell. Neutral membranes are used which have a carbon-carbon backbone to which nonhydrolizable branches with hydrophilic side groups are grafted.

3,616,387
METHOD AND APPARATUS FOR THE TRANSFER OF FLUID SAMPLES

Christopher J. Siebert, Berkeley, and Douglas W. Hull, Richmond, both of Calif., assignors to Bio-Rad Laboratories, Richmond, Calif.

Filed Nov. 13, 1969, Ser. No. 876,456
Int. Cl. B01k 5/00
U.S. Cl. 204—180 G 19 Claims



A fluid sample is transferred to a gellike substance by first suspending the sample in slits of an applicator that retain the sample by capillary action. The slits extend transversely through the applicator and intersect a wedge shaped end of the applicator. The insertion of the applicator in the gel forms an incision therein and the wedge shaped end opens the incision so that the gel contacts the sample in the slit. Forces acting on the suspended sample cause the transfer of at least a portion thereof to the gel. Upon withdrawal of the applicator the same portion is retained in the gel. Apparatus for performing the above described steps comprising a bridge applicator and means for holding a fluid sample and the gel is also disclosed.

3,616,388

PROCESS FOR THE PRODUCTION OF ELECTRICAL INSULATION

Walter Meier, Baden, and Franz Knapp, Zurich, both of Switzerland, assignors to Aktiengesellschaft Brown, Boveri & Cie, Baden, Switzerland

Filed Sept. 28, 1967, Ser. No. 671,211
Claims priority, application Switzerland, Dec. 20, 1966, 18182/66
Int. Cl. B01k *5/02*; C23b *13/00*
U.S. Cl. 204—181 3 Claims

A method of coating an electrical conductor with an insulating material comprising the steps of dispersing a finely ground micronitic mineral powder such as magnesium-aluminum silicate or potassium-aluminum silicate in a solution of a binder agent the concentration of which is adjusted so that each particle of the powder will be ultimately coated with only a thin skin of the binder agent, drying the dispersion so as to evaporate the solvent and establish a meallike powder in which the individual binder coated particles do not adhere to each other, and then applying the dried binder-coated particles to the electrical conductor. An after-heat treatment of the coated electrical conductor is utilized to cement the particles together and in the case of a hardenable binder, such as an epoxy resin, to harden it.

Drying of the dispersion can be effected by the spray drying technique in which all of the solvent is evaporated prior to particle impingement, or by using a rotating drum.

Application of the dried binder-coated particles can be effected by an electrophoresis bath technique, or by the suspension method, or by electrostatic spraying.

3,616,389

PROCESS FOR PRODUCING ELECTROPHORETICALLY INSULATED CONDUCTORS AND COILS

Yoichiro Onishi, and Takashi Suetake, both of Amagasaki-shi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed June 28, 1968, Ser. No. 740,857
Claims priority, application Japan, June 28, 1967, 42/41436
Int. Cl. B01k *5/00*; C23b *13/00*
U.S. Cl. 204—181 6 Claims

A method for manufacturing an insulated conductor comprising the steps of:

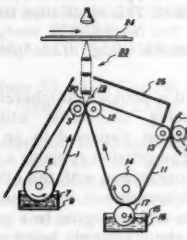
a. electrophoretically precipitating an insulating coating onto the surface of a conductor,
b. heating said coating until said coating is in a semisolidified state,
c. forming said conductor into a desired configuration, and
d. subsequently solidifying said coating by further heating.

3,616,390

AN ELECTROPHORETIC IMAGING METHOD CHARACTERIZED BY EXPOSURE OF ELECTRICALLY PHOTOSENSITIVE PARTICLES AT A LIQUID NIP

John W. Weigl, West Webster, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Sept. 17, 1968, Ser. No. 760,311
Int. Cl. G03g *13/22*
U.S. Cl. 204—181 6 Claims



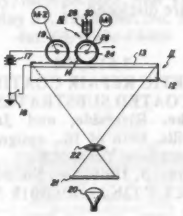
A photoelectrophoretic imaging system and apparatus are described wherein electrically photosensitive particles dispersed in a carrier liquid are subjected to an electric field and exposed to imagewise light causing selective particle migration in image configuration. The imagewise exposure is directed at a liquid nip of the particle-liquid suspension. The exposure is not directed through either nip forming surface.

3,616,391

ELECTROPHORETIC IMAGING PROCESS INCLUDING APPLICATION OF DYNAMIC STRESS ON THE PARTICLE SUSPENSION

Edwin Zucker, Rochester, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Oct. 3, 1968, Ser. No. 764,720
Int. Cl. G03g *13/22*; B01k *5/00*
U.S. Cl. 204—181 3 Claims



Method and apparatus for improving image density, contrast and quality and photographic speed in a photoelectrophoretic imaging system utilizing a particulate suspension for forming the image. The method and apparatus stresses an electrophoretic suspension of particles in a carrier on an electrode by applying forces across the image suspension during imaging through sliding motion between the electrodes.

3,616,392

METHOD FOR COATING CONDUCTIVE ARTICLES

Eugene E. Haney, Middletown, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio

Filed Dec. 4, 1968, Ser. No. 781,049
Int. Cl. B01k *5/00*; C23b *13/00*
U.S. Cl. 204—181 6 Claims

Electrical deposition of organic film from an aqueous solution simultaneously on a plurality of conductive articles in a conductive container wherein the articles are thoroughly cleaned, a conversion coating is applied to the articles, the conversion coating is dried at an elevated temperature, the articles are immersed in the aqueous solution while in the conductive container, current is passed through the container and solution to irreversibly deposit the organic coating on the articles, and the articles having the coating are baked.

The apparatus includes means within a tank holding the aqueous solution for receiving a plurality of articles to be coated, and for shifting the position of the articles relative to each other at predetermined time intervals.

3,616,393

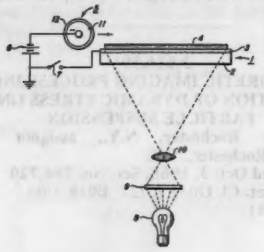
PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A PIGMENT HAVING THE FORMULA $R_2N_4S_2$

Bernard Grushkin, Pittsford, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Jan. 2, 1969, Ser. No. 789,104
Int. Cl. B01k *5/00*
U.S. Cl. 204—181 4 Claims

Methods of employing a compound having the formula

$R_2N_4S_3$ wherein R is selected from the group consisting of a substituted or unsubstituted fluorenyl, anthryl,



dibenzocycloheptenyl or indenyl group in electrophoretic imaging processes are disclosed.

3,616,394

ELECTROPHORETIC REPAIR COATING OF ENAMEL COATED SUBSTRATES

Edward E. Koepke, Riverside, and James M. Throne, Country Club Hills, both of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Filed Mar. 3, 1969, Ser. No. 804,017

Int. Cl. C23b *13/00*; **B01k** *5/02*

U.S. Cl. 204—181 **8 Claims**

In a process for electrophoretic repair coating of articles coated with base coat enamels, the shaped article having a hardened enamel coating applied thereto is heated or baked at a temperature between about 300° and about 450° F. before contact of the enamel coated article with the electrophoretic coating bath.

3,616,395

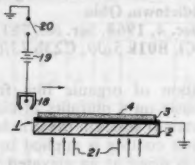
PHOTOELECTROPHORETIC IMAGING WITH CORONA FIELD APPLICATION

Leonard M. Carreira, Penfield, and Vsevolod Tulagin, Rochester, both of N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Continuation-in-part of application Ser. No. 561,587, June 29, 1966, now Patent No. 3,477,934, dated Nov. 11, 1969. This application June 9, 1969, Ser. No. 831,684

Int. Cl. G03g *13/22*; **B01k** *5/00*; **C23b** *13/00*

U.S. Cl. 204—181 **4 Claims**



A photoelectrophoretic imaging system and apparatus are described wherein electrically photosensitive particles dispersed in a carrier liquid are subjected to an electric field and exposed to imagewise light causing selective particle migration in image configuration. An electrostatic charge formed on the surface of the imaging suspension provides the electric field.

3,616,396

ELECTROPHORETIC COATING PROCESS

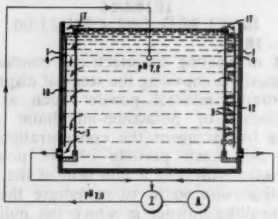
Ralph G. Swanson, Flint, Mich., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of application Ser. No. 457,551, May 21, 1965, now abandoned. This application July 18, 1969, Ser. No. 860,131

Int. Cl. B01k *5/02*; **C23b** *13/00*

U.S. Cl. 204—181 **4 Claims**

An improved process for the electrophoretic deposition of a coating on a metal article in which the bath contains an electrically charged film-forming material and a porous partition which separates the article being coated (e.g., the anode) from electrode (e.g., the cathode) and in which a portion of the bath which is deficient in film-forming material



is removed and replenished with film-forming material and recycled into the bath in the proximity of the article being coated. An apparatus having the required novel features necessary for the improved electrophoretic process is also disclosed.

3,616,397

PROCESS FOR THE ELECTRODEPOSITION OF METALLIC PAINT FILMS

James E. Lohr, Drexel Hill, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 7, 1969, Ser. No. 864,551

Int. Cl. B01k *5/02*; **C23b** *13/00*

U.S. Cl. 204—181 **9 Claims**

A process for electrocoating a film-forming polymeric composition containing metallic flake particles on the anode of an electrocoating cell is the subject of this invention; the bath utilized in the electrocoating cell comprises a uniformly dispersed film-forming organic polymer which has pendent acid groups and has an acid number of 0.5–300 and is neutralized with a water-soluble compound which is either a metal hydroxide, a water-soluble amine, a water-soluble polyamine, or a water-soluble hydroxy amine, and the bath contains pigment particles of metallic flake which are coated with a thin layer of a cross-linked polymer and have a diameter to thickness ratio of about 40:1 to 1,000:1 and the bath has a pigment to binder ratio of about 1:100 to about 10:100; methods for making the aqueous dispersions for use in the electrocoating bath are also disclosed.

3,616,398

A PHOTOELECTROPHORETIC IMAGING COMPOSITION CONTAINING B-CAROTENE

Raymond L. Jelfo, Sodus Point, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Continuation-in-part of application Ser. No. 624,005, May 29, 1967, now abandoned. This application Dec. 24, 1969, Ser. No. 887,878

Int. Cl. G03g *13/22*, *5/06*

U.S. Cl. 96—88 **3 Claims**

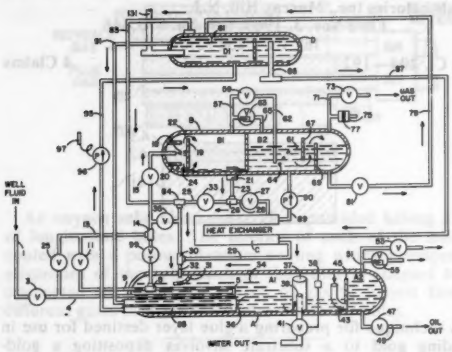
There is disclosed a photoelectrophoretic imaging system wherein the imaging suspension utilized contains a photomigratory pigment dispersed in an insulating carrier liquid. The imaging suspension contains a vitamin precursor, beta carotene, in conjunction with the other components of the vehicle. The suspension is interpositioned between at least two electrodes and subjected to a potential difference while substantially simultaneously being selectively exposed to a reproducible image by a source of electromagnetic radiation. As a result of the suspension of the present invention it is now possible by regulating the polarities of the electrodes in the system to produce both negative and positive images from a single sense input.

3,616,399

SINGLE-HEATER WELL FLUID SEPARATION METHOD

James B. Smith, P.O. Box 484, Aztec, N. Mex.

Filed May 7, 1969, Ser. No. 822,633
Int. Cl. C10g *33/04*
U.S. Cl. 208—188 8 Claims



A method of separating well fluid under pressure into oil, gas, and water, utilizing a single heater to provide the heat necessary to heat the well fluid in the high-pressure side of the system for separating gas therefrom, heat a water absorbent liquid used to absorb water vapor from the separated gas, and heat the degasified liquid in the low-pressure side of the system for separation into oil and water.

3,616,400

METHOD OF MAKING THIN FILM CAPACITOR

Kiyotaka Wasa, and Shigeru Hayakawa, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 809,801, Mar. 24, 1969.
Filed Jan. 7, 1970, Ser. No. 6,009
Claims priorities, application Japan, Mar. 25, 1968, Sept. 13, 1968, Sept. 13, 1968, Sept. 13, 1968, 43/19851, 43/66390 43/66391, 43/66389
Int. Cl. C23c *15/00*
U.S. Cl. 204—192 4 Claims

A method of making a thin film capacitor. A base electrode is formed in the form of a thin titanium metal film on a substrate. A tin dielectric layer is formed on the titanium metal film by sputtering from a composite cathode. The cathode consists essentially of lead and titanium, and the atmosphere in the sputtering atmosphere is oxidizing atmosphere, so that the thin dielectric layer consists essentially of lead oxide and titanium oxide.

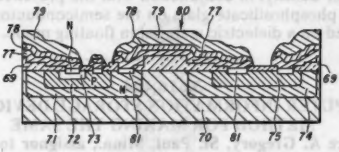
3,616,401

SPUTTERED MULTILAYER OHMIC MOLYGOLD CONTACTS FOR SEMICONDUCTOR DEVICES

James A. Cunningham, Richardson, and Coy D. Orr, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas 31, Tex.

Filed June 30, 1966, Ser. No. 561,845
Int. Cl. C23c *15/00*
U.S. Cl. 204—192 6 Claims

Disclosed are methods for depositing multilayer ohmic contacts upon a substrate of semiconductor material disposed within a low pressure chamber; such including for example the particular features of upward sputtering of the various metal films including deposition of a thin layer of molybdenum directly on initially formed integral areas of platinum silicide, followed by simultaneous sputtering of platinum with gold utilizing a sputtering cathode composed of platinum and gold, with the addition of hydrogen into an inert sputtering atmosphere to eliminate undesireable formation of oxides. This invention provides improved adhesion of the sputtered metal films to the semiconductor surface and the silicon oxide, and provides the formation of



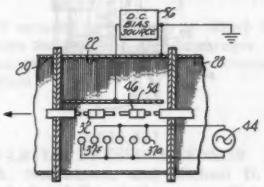
the metal film which is substantially free of pin holes and which has substantially uniform resistivity.

3,616,402

SPUTTERING METHOD AND APPARATUS

Henry Y. Kumagai, Pennington, N.J., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed May 31, 1968, Ser. No. 733,594
Int. Cl. C23c *15/00*
U.S. Cl. 204—192 17 Claims



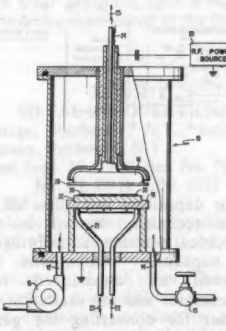
Substrate heating by plasma electron bombardment during the sputtering of a thin film in a deposition chamber is considerably reduced by utilizing, as the sputtering target, an AC-excited array of parallel tubes formed from the film material. An oscillating electric field of large amplitude is established between adjacent ones of the tubes to entrap free electrons of the chamber gas and to thereby prevent the electrons from reaching the substrate. An auxiliary conductive member mounted adjacent and parallel to the array is biased with a DC voltage of selectable polarity for increasing the deposition rate of the sputtered material without altering the chamber pressure.

3,616,403

PREVENTION OF INVERSION OF P-TYPE SEMICONDUCTOR MATERIAL DURING RF SPUTTERING OF QUARTZ

Robert H. Collins, Wappingers Falls, and Joseph S. Logan, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 25, 1968, Ser. No. 770,477
Int. Cl. C23c *15/00*
U.S. Cl. 204—192 6 Claims



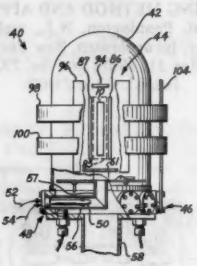
Method for preventing inversion of semiconductor surfaces during RF sputtering of dielectrics by maintaining a low flat

band charge level at the semiconductor interface. The flat band charge level is controlled by rigidly maintaining various parameters of the sputtering system such as target purity, and RF power density, in conjunction with the presence of a thin layer of phosphosilicate glass on the semiconductor which is supported on a dielectric material in floating mode.

3,616,404
COMPUTER INFORMATION STORAGE DEVICE AND METHOD FOR MAKING THE SAME

Lawrence A. Gregory, St. Paul, Minn., assignor to Precision Magnetics, Inc.

Filed Sept. 24, 1969, Ser. No. 860,725
Int. Cl. C23c *15/00*
U.S. Cl. 204—192 **8 Claims**

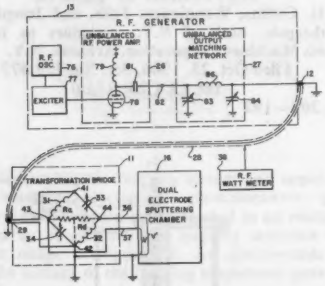


The apparatus aspect of the disclosure describes a computer information storage device comprising a wire, a magnetic material substantially surrounding the wire, and a coating located between the wire and the magnetic material for providing a smooth surface on which the magnetic material may be deposited. The coating also provides a barrier that prevents diffusion of the wire into the magnetic material.

3,616,405
CONTINUOUS SPUTTERING SYSTEM

Harvey James Beaudry, Fremont, Calif., assignor to International Plasma Corporation

Filed Oct. 3, 1969, Ser. No. 863,601
Int. Cl. C23c *15/00*
U.S. Cl. 204—192 **11 Claims**

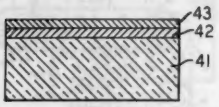


In a system for depositing thin films of material on a workpiece by a technique known as radiofrequency sputtering, an electrical transformation bridge comprised of inductive and capacitive components is electrically interfaced between an unbalanced output of a radiofrequency generator and the excitation electrodes of a sputtering chamber for converting the generator output signal into opposing phase radiofrequency voltage components employed in preferred continuous sputtering systems and for precisely matching the impedance output of the generator with the impedance of the excitation electrodes while the latter are under the influence of a plasma of charged deposition particles.

3,616,406
PREPARATION OF GLUE LAYER FOR BONDING GOLD TO A SUBSTRATE

Paul A. Truner, Murray Hill, N.J., assignor to Bell Telephone Laboratories Inc., Murray Hill, N.J.

Filed Nov. 3, 1969, Ser. No. 873,446
Int. Cl. C23c *15/00*
U.S. Cl. 204—192 **4 Claims**

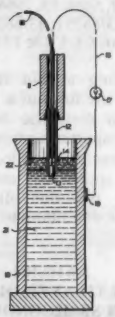


A technique for preparing a glue layer destined for use in bonding gold to a substrate involves depositing a gold-transition metal alloy upon a substrate member by cathodic sputtering techniques.

3,616,407
ARRANGEMENT FOR DETERMINING THE PRESENCE OF AN ACTIVE ELEMENT IN A BODY OF MOLTEN METAL

Hans-Jurgen Engell, Stuttgart, and Eberhard Schulte, Dortmund-Hombruch, both of Germany, assignors to Hoesch Aktiengesellschaft, Dortmund, Germany

Filed Oct. 14, 1966, Ser. No. 588,244
Claims priority, application Germany, Oct. 14, 1965, P 15 98 540.7, June 25, 1966, P 15 98 559.8
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 **21 Claims**

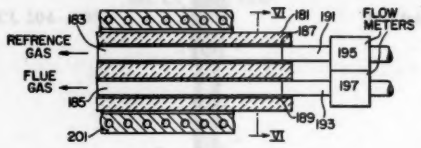


An apparatus for monitoring the oxygen content of liquid metals. A tubular shield surrounds a standard reference electrode and has an open end in which there is sealingly arranged a solid electrolyte member which is electrically connected with the reference electrode and which projects in part from the open end. Measuring means is connected with the reference electrode as well as with the mass of molten metal whose oxygen content is to be monitored. Immersion of the projecting portion of the solid electrolyte member is the mass of molten metal results in establishing of a voltage differential between the reference electrode and the mass of molten metal which voltage differential serves as an indication of the proportion of oxygen in the molten metal.

3,616,408
OXYGEN SENSOR

Willaim M. Hickam, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 514,871, Dec. 20, 1965, Pat. No. 3,404,836.
Filed May 29, 1968, Ser. No. 732,950
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 **4 Claims**

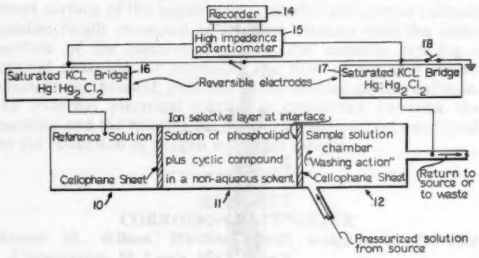


An oxygen solid-electrolyte cell is provided having a pair of longitudinal holes. The interior of each of the holes is coated with a porous platinum coating which provides the electrodes of the cell. Each of the holes is adapted to be connected to a separate source of gas to permit flow of different gases over the electrodes within the holes.

3,616,409
ELECTRODE SYSTEM FOR MEASURING ION ACTIVITIES IN STREAM OR SAMPLE

Daniel C. Tosteson, Durham, N.C., assignor to Duke University, Inc., Durham, N.C.

Filed June 7, 1968, Ser. No. 735,286
Int. Cl. G01n *27/30, 27/40*
U.S. Cl. 204—195 **2 Claims**



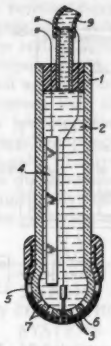
Continuous measurement of the activity of a particular chemical species of ion in a continuously flowing aqueous solution is obtained in a closed electrode system in which the flow is directed past a sensing electrode, the sensing electrode being convertible to measuring similar activity in static solutions. The selective element embodies a mechanically stable layer which contains an ion selective macrocyclic compound and which layer is established by a surface active agent between the aqueous solution and a nonaqueous phase, the agent and compound being dissolved in a solvent to form the nonaqueous phase.

3,616,410
PARTIAL GAS PRESSURE TRANSDUCER

Leonid Davidovich Shtoffer, Vysheslavtsev Pereulok, 9, kv. 6, and Viktor Fedorovich Bashutkin, Stantsia Perlovskaya, 3 Yaroslausky pereulok, 4, both of, Moscow, U.S.S.R.

Filed Sept. 23, 1968, Ser. No. 761,594
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 **1 Claim**

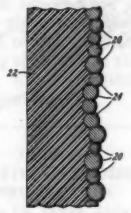
A partial gas pressure transducer comprises a polarographic cell having a body containing electrolyte solution connected to a conduit leading to a header which is at atmospheric pressure and temperature. An indicator electrode is mounted on a perforated rigid partition secured to the body such that the indicator electrode is external of the body. The partition provides communication between the indicator electrode and the electrolyte solution in the body. The partition may be integral with the body. A gas-permeable diaphragm externally covers the indicator electrode and is secured to the body to clamp the indicator electrode between the partition and diaphragm. An auxiliary electrode is mounted within the cell in contact with the electrolyte solution.



3,616,411
PARTIAL PRESSURE SENSOR

Fred P. Rudek, Norristown, and Michael D. Rutkowski, Phoenixville, both of Pa., assignors to General Electric Company

Filed Sept. 16, 1968, Ser. No. 762,299
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 **1 Claim**



In a redox cell type of partial pressure sensor, in which an entrant gas, metered by passage through a diffusion barrier, is ionized by contact with an adsorbing catalyst in the presence of an electrolyte, the stability of calibration with time, and the speed of response to changes in partial pressure, are both improved by providing the catalyst as a minimally thick layer deposited upon a nonabsorbing metal, the combination being maintained at the face of the diffusion barrier.

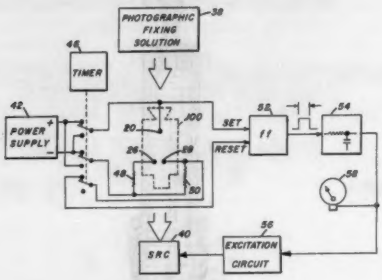
3,616,412
METAL RECOVERY UNIT

Oliver W. Gnage, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 25, 1968, Ser. No. 762,386
Int. Cl. B01k *3/00, 3/02*
U.S. Cl. 204—195 **6 Claims**

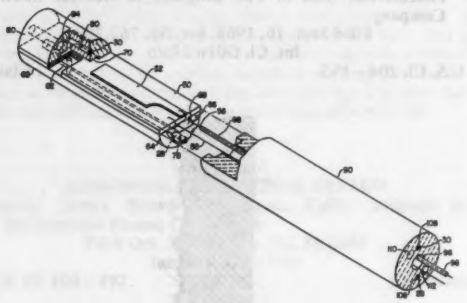
A coulometric device which may be used to determine the concentration of silver in solutions used in photography is disclosed. The device may be made an in-line part of a system for the recovery of such silver. The device is of simple rugged construction and utilizes for silver-determining purposes three electrically conductive probes which are housed within a chamber, such chamber having inlet and outlet orifices. One probe is situated near the inlet orifice; the other two probes are near each other, and near the outlet

orifice. The first probe, and the second and third probes, are periodically reverse excited. Silver periodically builds up on the second and third probes, causing the resistance



therebetween to lower periodically. The duration necessary to lower such resistance to a certain threshold level is proportional to silver concentration.

3,616,413
SOLID ELECTROLYTE OXYGEN SENSOR
Philip Reichner, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Oct. 8, 1968, Ser. No. 765,834
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 **1 Claim**



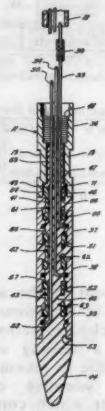
The invention relates to a solid electrolyte oxygen sensor comprising a solid electrolyte operating at an elevated temperature which measures the difference in concentration of oxygen on either side of the solid electrolyte layer in contact with two electrodes to generate an open circuit voltage. The sensor is enclosed within a sealed container. The cell is a symmetrical structure consisting of a platelike electrolyte with electrodes positioned on a portion of the surfaces and with two cell halves of a suitable material covering the solid electrolyte member and guiding the gas flow over the electrodes to permit two similar flow paths to join at the edge of the electrolyte plate.

3,616,414
REFERENCE ELECTRODE
Jan Van Houwelingen, Amersfoort, Netherlands, assignor to Electrofact N.V., Amersfoort, Netherlands
Filed Dec. 16, 1968, Ser. No. 783,999
Claims priority, application Netherlands, Dec. 18, 1967, 6717256
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 **9 Claims**

A reference electrode for measuring ion potentials is composed of a tubular member forming a housing with another tubular member located within the housing and dividing it into a pair of chambers in communication with one another, each containing a different fluid. One of the chambers contains an electrolyte and has exit apertures to leak the electrolyte into the fluid being measured. By the

syphon principle the fluid being measured enters the other chamber while the electrolyte leaks from the one chamber.

3,616,415
AXIAL CORROSION RATE PROBE
Frederick D. Watson, and Weldon D. Mayse, both of Houston, Tex., assignors to Petrolite Corporation, St. Louis, Mo.
Filed June 25, 1969, Ser. No. 836,542
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 **14 Claims**

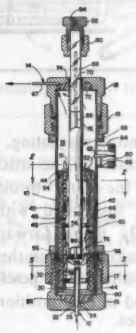


An axial corrosion rate probe having tubular metal electrodes, cylindrical insulator spools, a round-nosed end cap and a tubular metal base interfitted into a nested arrangement. An insulator spool separates the electrodes from one another and from the base with the spools telescoped into the electrodes and the base. A central cylindrical passageway extends through the base, insulators and spools. Electrical conductors extend from the electrodes through the central passageway into the base. A nonconductive elastomer fills all voids in the central passageway, and forms the end cap. The elastomer extends from the central passageway through openings in the spools to encircle each of the spools with an exposed cylindrical surface which extends longitudinally between adjacent electrodes. The base, electrodes, elastomer-surrounded spools and end cap preferably have a uniform diameter exposed cylindrical surface. The elastomer integrally connects elements of the probe into a unitary elongated structure.

3,616,416
OXYGEN DETECTOR FOR ANALYSIS OF OXYGEN IN GASEOUS STREAMS INCLUDING AN INTERNAL HUMIDIFIER

Amos Linenberg, Rehovot, Israel, and Herman S. Preiser, Ellicott City, Md., assignors to Hydronautics, Inc., Laurel, Md.

Filed July 2, 1969, Ser. No. 839,803
Int. Cl. B01k *3/00*
U.S. Cl. 204—195 **24 Claims**

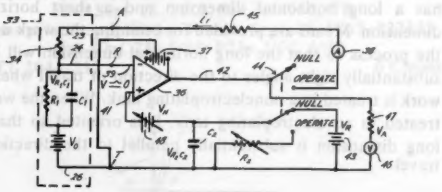


A galvanic oxygen detector comprising a metallic tubular housing having gas inlet and outlet means; a tubular and consumable anode concentrically mounted in intimate electrical contact with the inner surface of the housing; a tubular, porous and nonconductive electrolyte retentive matrix concentrically mounted in intimate contact with the inner surface of the anode; and a tubular and porous cathode concentrically mounted in intimate contact with the inner surface of the electrolyte matrix, the cathode defining a central chamber for confining the flow of gas that passes through the housing over the inner surface of the cathode. An external electrical circuit is connected between the cathode and the housing for measuring the current generated by the reduction of oxygen in the gas sample.

3,616,417
CORROSION RATE METER

Homer M. Wilson, Houston, Tex., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Aug. 13, 1969, Ser. No. 849,734
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 **12 Claims**

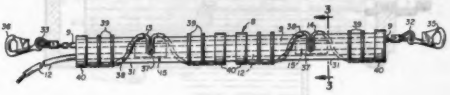


A corrosion rate meter with metallic electrodes contactable by a corrodent, including a test specimen electrode, a reference electrode and a third or auxiliary electrode. A current loop circuit connects the test specimen and third electrodes to a first input and common output of a differential amplifier and a direct current supply means. Polarizing current in the current loop circuit passes through the third electrode and the test specimen electrode to produce an exponential voltage change at the test specimen electrode with a time constant of resistance and capacitance about this electrode. A voltage loop circuit connects the test specimen electrode and the reference electrode between the first and second inputs of the differential amplifier. A signal generating source in the voltage loop circuit produces a voltage signal changing exponentially from a first value to a second value with the resistance-capacitance time constant characteristic of the polarizing voltage change at the test specimen electrode. The voltage signal and polarizing voltage change combine as an input signal across the first and second inputs of the differential amplifier to produce the polarizing current flow in the current loop circuit at a substantially constant value until a predetermined polarizing voltage is generated at the test specimen electrode. Means provide a readout of the constant value of current flow through the test specimen electrode and the third electrode while the voltage signal is changing exponentially. The value of current flow can be correlated to the corrosion rate of the test specimen electrode.

3,616,418
ANODE ASSEMBLY FOR CATHODIC PROTECTION SYSTEMS

Edward P. Anderson, Livingston, N.J.; Paul B. Byrne, Warren, N.J., and Risque L. Benedict, Upland, Calif., assignors to Engelhard Minerals & Chemicals Corporation

Filed Dec. 4, 1969, Ser. No. 882,127
Int. Cl. C23f *13/00*
U.S. Cl. 204—196 **4 Claims**

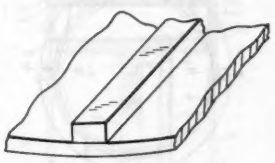


An anode assembly for cathodic protection systems, especially for the cathodic protection of submerged spaced supporting legs of offshore platforms, comprising an elongated carrier cable adapted for spanning the spaced submerged legs of the platform and carrying an elongated anode along the length of the cable intermediate the ends thereof, the anode being spaced from the connecting ends of the cable to provide for substantially uniform current distribution to the platform legs.

3,616,419
ARRANGEMENT FOR CATHODIC CORROSION PROTECTION

Luigi Bagnulo, Via Volta 18, Milan, Italy

Filed Mar. 15, 1968, Ser. No. 713,551
Claims priority, application Italy, Mar. 15, 1967, 792945
Int. Cl. C23f *13/00*
U.S. Cl. 204—197 **11 Claims**



A metallic element which is to be cathodically protected against corrosion has secured to one of its surfaces a strip-shaped anode extending along at least one generatrix and being in substantially continuous electrically conductive contact with such surface so that current will flow between the strip, which constitutes an anode, and the element, which constitutes a cathode, at substantially identical density all along the strip.

3,616,420
ALUMINIUM BASE ALLOYS AND ANODES

Trevor Broughton, Beaconsfield, England, assignor to The British Aluminium Company Limited, London, England

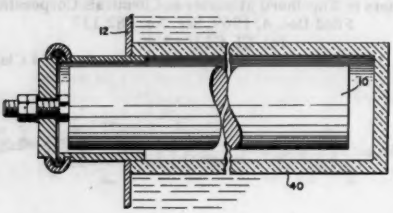
Filed Nov. 25, 1968, Ser. No. 778,752
Int. Cl. C23f *13/00*
U.S. Cl. 204—197 16 Claims

Aluminum base alloys which are suitable for use in the as cast state as galvanic anodes, the alloys comprising 1–15% zinc, 0.005–0.1% indium and 0.4–10% magnesium, the balance being aluminum of at least 99.8 percent purity with inconsequential impurities. The alloy may optionally include some tin, for example in the range of 0.1–0.5 percent, some gallium in the range of from 0.005 to 0.017 percent and a grain refiner such as titanium and zirconium.

3,616,421
SACRIFICAL ANODE CONSTRUCTION

William D. Mackintosh, Tulsa, Okla., assignor to Atlantic Richfield Company, New York, N.Y.

Filed Mar. 17, 1969, Ser. No. 807,500
Int. Cl. C23f *13/00*
U.S. Cl. 204—197 11 Claims

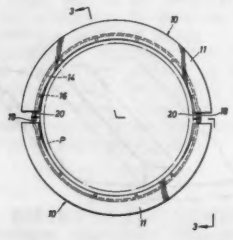


A sacrificial anode construction in which the anode is supported in a loose-fitting porous container within the vessel to be protected. The container is constructed to substantially cease liquid flow around the anode when desired so that the anode can be replaced without the loss of an appreciable amount of liquid within the vessel.

3,616,422
GALVANIC ANODE

Gordon L. Doremus, and Jack C. Davis, both of Houston, Tex., assignors to Cathodic Protection Service, Houston, Tex.

Filed Apr. 21, 1969, Ser. No. 817,916
Int. Cl. C23f *13/00*
U.S. Cl. 204—197 5 Claims

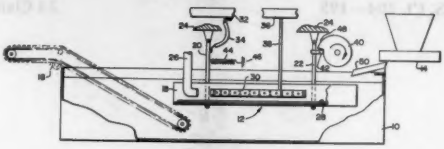


A galvanic anode adapted particularly for the cathodic protection of relatively large diameter pipelines submerged in water bodies. The anode consists of a pair of semicylindrical segments constructed of a suitable galvanic metal and having completely embedded within the galvanic metal steel core or armature sections, adapted to be connected together to join the anode sections into a "bracelet" about the pipe.

3,616,423
CONTINUOUS PLATING SYSTEM

Elbert R. Faust, Woodbury, Conn., assignor to M & F Chemicals Inc., New York, N.Y.

Filed Feb. 3, 1969, Ser. No. 796,033
Int. Cl. B65g *49/02*
U.S. Cl. 204—198 7 Claims

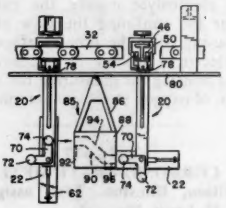


A system for the continuous plating, cleaning or rinsing of articles wherein all surfaces of the articles are uniformly and entirely exposed to the fluid through which they are conveyed. A trough suspended within a fluid bath is operative to cyclically move forward and upward and abruptly return to its initial position thereby to cause articles in the trough to inertially fall to positions successively forward of the trough and in new positions with respect to the trough and other articles.

3,616,424
PLATING MACHINE AND METHOD OF PLATING

James Barton, Grosse Pointe Woods, Mich., assignor to Ionic International, Inc., Warren, Mich.

Filed Jan. 23, 1969, Ser. No. 793,338
Int. Cl. C23b *5/68*; B65g *49/00*
U.S. Cl. 204—202 5 Claims



A plating machine is provided for electroplating work. The machine includes a series of treating stations which comprise electroplating tanks and nonelectroplating tanks. The work has a long horizontal dimension and a short horizontal dimension. Means are provided for orienting the work during the process so that the long horizontal dimension will be at substantially right angles to the direction of travel when the work is treated in a nonelectroplating tank. When the work is treated in an electroplating tank, it is oriented so that the long dimension is substantially parallel to the direction of travel.

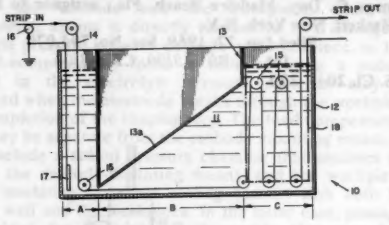
3,616,425
APPARATUS FOR CONTINUOUS FORMING OF ANODES FOR CAPACITORS

Gerhart P. Klein, Manchester, and Milton Kallianides, Brockton, both of Mass., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

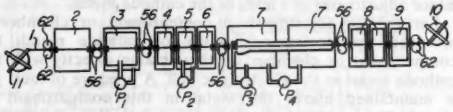
Continuation of application Ser. No. 670,723, Sept. 26, 1967, now abandoned. This application Dec. 10, 1969, Ser. No. 880,487
Int. Cl. C23b *5/68*
U.S. Cl. 204—206 5 Claims

A tank for an electrolyte is functionally divided into three

sections for the continuous generation of anodic oxide on an endless moving strip passing through the tank.

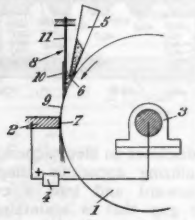


3,616,426
CONTINUOUS PLATING APPARATUS
Kaname Nakao, Neyagawa-shi, and Takashi Suzuki, Takatsuki-shi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed June 2, 1969, Ser. No. 829,265
Claims priority, application Japan, June 4, 1968, 43/38927
Int. Cl. C23b *5/68*
U.S. Cl. 204—207 **3 Claims**



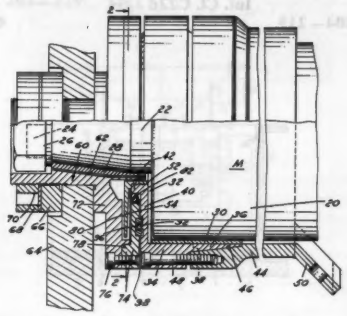
An apparatus for continuously plating a sheet of a metal such as steel comprising means for feeding a sheet to be plated, pretreatment baths, a plating bath, aftertreatment baths and a winder for taking up the plated sheet all arranged successively in a row, said baths having therein aligned slits for allowing the sheet to be passed linearly therethrough in a manner that the sheet is held vertical, said plating bath having therein means for causing plating liquid to flow in parallel relation with the sheet whereby a plating of good quality may be rapidly attained without any fold and wrinkle produced in the sheet.

3,616,427
APPARATUS FOR THE ELECTROLYTIC TREATMENT OF METALLIC PIECES
Paul Marie Gaston Linden, Franconville, France, assignor to Societe Nationale D'Etude Et De Construction De Moteurs D'Aviation, Paris, France
Filed Sept. 18, 1968, Ser. No. 760,475
Claims priority, application France, Sept. 26, 1967, 122333
Int. Cl. C23b *5/68;* **B23p** *1/00, 1/02*
U.S. Cl. 204—212 **6 Claims**



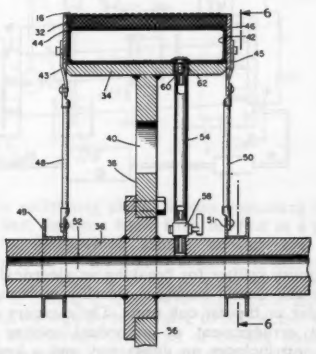
The apparatus comprises a movable electrode disposed near to the work piece to be treated, a current generator whose two terminals are respectively connected to the electrode and to the work piece, and supply means for depositing an electrolyte between the workpiece and the electrode. Deflection means are provided for giving the layer of electrolyte the character of a thin film. These deflection means can be in the form of a blade, flexible or rigid, urged elastically against the electrode, or in the form of a gaseous jet tangent to or striking the electrode at a point between the supply means and the workpiece.

3,616,428
POWER SPINDLE FOR ELECTROCHEMICAL GRINDING
David L. Bogue, Pompano Beach, Fla., assignor to KMS Industries, Inc., Ann Arbor, Mich.
Filed Sept. 5, 1969, Ser. No. 855,561
Int. Cl. C23b *5/70;* **B23p** *1/10*
U.S. Cl. 204—212 **6 Claims**



A power spindle for electrochemical grinding machine utilizing a grinding wheel, there being an electrical connection to the moving wheel accomplished through a body of mercury. An annular recess formed in a drive housing on the rotating spindle confines the body of mercury and an annular plate, insulated from the spindle and forming a drive motor, is mounted in a manner to be supported by the motor and fastened to project into the annular recess to create an electrical connection between a secondary housing surrounding the motor and the drive housing which rotates with the spindle.

3,616,429
APPARATUS FOR MAKING PERFORATED METAL FOIL
John J. MacKinney, Narberth, Pa., assignor to The Budd Company, Philadelphia, Pa.
Filed May 14, 1969, Ser. No. 824,551
Int. Cl. B23p *1/12*
U.S. Cl. 204—216 **8 Claims**



Apparatus for making perforated metal foil includes a conductive cylindrical member having openings therein and

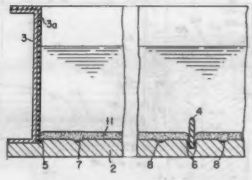
adapted to receive electrodeposited metal to form the foil. A pliable insulated element is disposed within the cylindrical member. Means are provided for pressing the insulated element against the interior of the cylindrical member causing portions of the insulated element to protrude through the openings. Metal may then be deposited on the cylindrical member but not on the portions of the insulated element extending through the openings.

3,616,430

ELECTROLYTIC CELLS FOR PREPARING ALKALIS BY THE MERCURY PROCESS

Teruo Imai, Iwaki-shi, Japan, assignor to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo-To, Japan

Filed Jan. 15, 1969, Ser. No. 791,400
Claims priority, application Japan, Jan. 19, 1968, 43/2672
Int. Cl. C22d *1/04*
U.S. Cl. 204—219 **4 Claims**



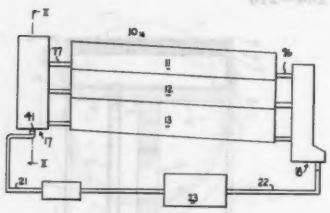
In an electrolytic cell designed for use in the mercury process and provided with longitudinal side grooves closely adjacent the surface of sidewalls, auxiliary grooves are provided on the surface of the bottom plate in parallel with the sidewalls at positions 1 to 10 cm. spaced apart therefrom to minimize lateral movement of mercury.

3,616,431

BIPOLAR MERCURY CATHODE CELL WITH MERCURY SPLITTER

Carl W. Raetzsch; John F. Van Hoozer, and Hugh Cunningham, all of Corpus Christi, Tex., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 10, 1969, Ser. No. 865,467
Int. Cl. C22d *1/04*; B01k *3/00*
U.S. Cl. 204—219 **7 Claims**



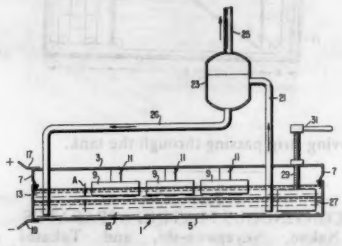
A mercury splitter for breaking an electrical current in a mercury cell circuit having a plurality of vertically stacked monopolar or bipolar cell units. The mercury splitter has a compact arrangement of individual splitter units. Each splitter unit includes an upper tray and a lower tray. The upper tray divides the mercury into fine streams which free fall, dividing into drops. The lower tray collects the mercury, forming a stream that is electrically separate from the mercury in the upper tray.

3,616,432

CATHODE LEVEL ADJUSTMENT MEANS

George G. Day, Madeira Beach, Fla., assignor to F. Barry Haskett, New York, N.Y.

Filed Jan. 27, 1969, Ser. No. 794,070
Int. Cl. B01k *3/00*; C22d *3/06*
U.S. Cl. 204—220 **6 Claims**



In an electrolytic cell employing a flowing molten metal cathode, a means to adjust the level between the anodes and molten metal cathode is provided comprising a refractory block capable of being raised and lowered within the cathode metal so as to displace the same and adjust the level of the molten metal. Such a means is most suitable for making minor adjustments in a level of the cathode metal.

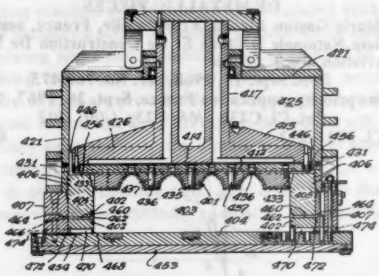
For greater adjustments a compartment or chamber is provided for storing a quantity of cathode metal, the compartment or chamber communicating directly with the cathode metal in the electrolytic cell. A pressure of inert gas is maintained above the metal in this compartment or chamber to be varied at will to cause cathode metal to flow to or from the cell to maintain the desired level.

3,616,433

ELECTROCHEMICAL MACHINING APPARATUS HAVING ELECTROLYTE PRESSURE RESPONSIVE LOAD COMPENSATING MEANS

Lynn A. Williams, Winnetka, Ill., assignor to Anocut Engineering Company

Continuation-in-part of application Ser. No. 680,811, Nov. 6, 1967, now abandoned , and a continuation-in-part of 762,077, Sept. 24, 1968. This application Aug. 11, 1969, Ser. No. 848,962
Int. Cl. B23p *1/02, 1/12*
U.S. Cl. 204—224 **19 Claims**



This application discloses an electrochemical machining or electrolytic demetallizing apparatus adapted to drive a shaping cathode toward and into a conductive metal workpiece, with a gap that is maintained between the cathode and workpiece being filled by pressurized, rapidly flowing electrolyte through which electric current flows between the cathode and workpiece. The apparatus contains drive means for producing relative movement of the cathode and workpiece at a constant rate along a path that determines the shaping of the workpiece. Also, a hydraulic load compensating means urges the cathode forward into the

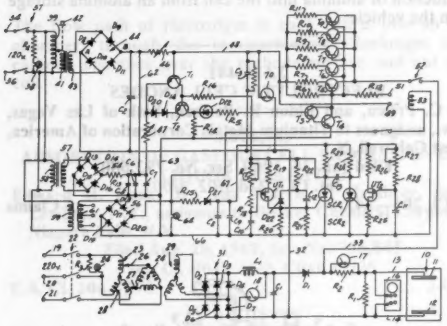
workpiece to at least partially counteract the tendency of the electrolyte pressure to produce relative retracting movement between the cathode and the workpiece. The load compensating means is directly responsive to a change of electrolyte pressure between cathode and workpiece, so that the load-compensating force is relieved upon a sudden decrease in the electrolyte pressure such as may be occasioned when the electrode breaks through the workpiece upon completion of the shaping step. The load compensating means may be separate from the cathode mounting means, or it may include a sealed pressure chamber that encloses the cathode, the cathode-mounting means, and the workpiece, with an insulating spacer in sealing contact with both the chamber wall and the workpiece. In the latter case, passages are provided for draining off electrolyte that may leak through the seal between the insulating spacer and the workpiece.

3,616,434

APPARATUS WITH POWER SOURCE FOR PLATING

Johann Karl Hausner, Chicago, Ill., assignor to Nova-Chrome, Inc., Chicago, Ill.

Filed Apr. 18, 1968, Ser. No. 722,435
Int. Cl. B01k *3/00*
U.S. Cl. 204—228 **5 Claims**



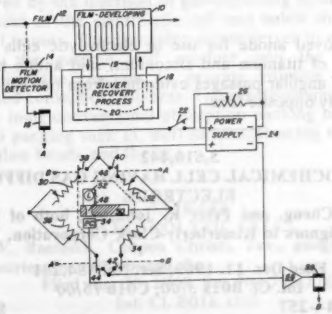
Apparatus and method for plating with a pulsating direct current variable in frequency so as to obtain desirable plating characteristics. The amplitude as well as the frequency of the plating current may be adjusted to obtain superior plating results.

3,616,435

INTEGRATION-CONTROLLED APPARATUS

Brian Favell, North Finchley; Richard G. Hall, Knebworth, and Brian Harris, Stevenage, all of England, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 6, 1969, Ser. No. 804,808
Int. Cl. B01k *3/00*; **C22d** *1/12*
U.S. Cl. 204—228 **7 Claims**



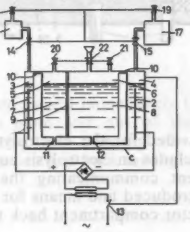
Photographic developing solutions dissolve silver during film processing. Processing occurs during a normal workday. Electrolytic recovery of silver may occur during, and after, the workday. The electrolyzing current is (preferably) set in proportion to a quiescent silver content of the developing solution; and the duration for applying the current is regulated in accordance with the integral of the difference between the rates of input and recovery silver. Other applications of the disclosed invention are possible.

3,616,436

OXYGEN STREAM DISPENSER

Georg Haas, Wilhelmstrasse 24, 7737 Bad Durrheim, Germany

Filed June 11, 1968, Ser. No. 736,051
Claims priority, application Germany, June 13, 1967, Jan. 30, 1968, Feb. 2, 1968, P 15 66 611.2, P 16 16 196.9, P 16 16 197.0
Int. Cl. C01b *13/06*
U.S. Cl. 204—229 **7 Claims**



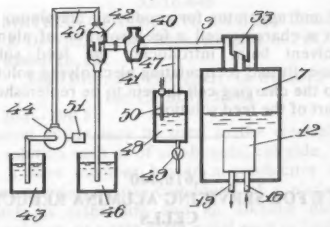
A unitary device for providing oxygen, from water, for breathing as a small stream or a breathing mixture when desired. The oxygen is provided in measured amounts by the opening and closing of valves in the inlet and exit lines of a storage chamber fed by an oxygen-producing electrolytic cell. Electrolysis by the cell is controlled according to the pressure of gas within the cell.

3,616,437

PLATING APPARATUS WITH RECOVERY OF PLATING CHEMICALS FROM RINSE WATERS

Aisaburo Yagishita, 5-2, Shinpo-cho, 4-chome, Chigusa-ku, Nagoya, Japan

Division of Ser. No. 587,607, Oct. 18, 1966, Pat. No. 3,542,651.
Filed Aug. 24, 1970, Ser. No. 66,398
Int. Cl. B01k *3/00*
U.S. Cl. 204—232 **4 Claims**

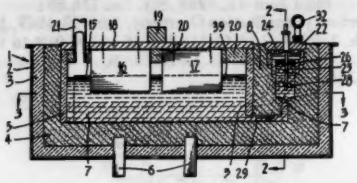


In a unit for reclaiming plating wastes containing chromic acid and the like, the rinse liquid from the first of a plurality of wash tubs into which plated articles are dipped successively to rinse off the plating solution, is sucked into a tower where it is heated by steam partially to vaporize and concentrate it to plating strength. The vapor generated in the tower is passed through a check valve to an ejector, where it is introduced transversely into a jet of cooling water to be condensed and conveyed with the stream of cooling water to a reservoir. The cooling-water jet develops a vacuum in the tower; and a trap is interposed between the tower and ejector to trap any cooling water which a faulty check valve might otherwise allow to back up into the tower.

3,616,438
PRODUCTION OF ALUMINUM AND ALUMINUM ALLOYS FROM ALUMINUM CHLORIDE

Ernest Foley, East Burwood, Victoria, Australia, and George Lang Herwig, Valentine, Wales, assignors to Conzinc Riotinto of Australia Limited and Commonwealth Scientific and Industrial Research Organization, Melbourne, Australia

Division of Ser. No. 517,769, Dec. 30, 1965, Pat. No. 3,464,900.
Filed Nov. 29, 1968, Ser. No. 779,672
1968, Ser. No. 779,672
Int. Cl. B01k *3/00*; C22d *3/02*
U.S. Cl. 204—237 6 Claims

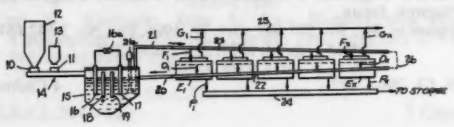


Apparatus is provided for the electrolytic production of aluminum which includes an electrolysis compartment and a reactor compartment communicating therewith to which Alchlor vapor is introduced and means for recycling molten metal from the reactor compartment back to the electrolysis compartment.

3,616,439
CONTINUOUS PROCESS FOR THE ELECTROLYTIC PRODUCTION OF ALUMINUM AND APPARATUS THEREFOR

Frank E. Love, Henderson, Nev., assignor to National Lead Company, New York, N.Y.

Division of Ser. No. 652,579, July 11, 1967, Pat. No. 3,501,387.
Filed Sept. 12, 1969, Ser. No. 870,908
Int. Cl. C22d *3/02*, *3/12*
U.S. Cl. 204—244 3 Claims



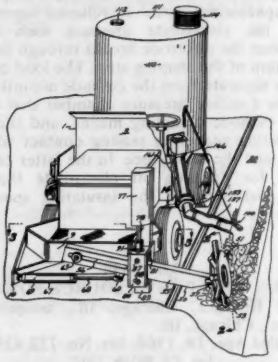
Method and apparatus for producing aluminum metal by forming in a charging cell a feed solution of alumina in a molten solvent bath, introducing the feed solution to electrolysis cells and recirculating electrolysed solution from the cells to the charging cell therein to be replenished by and become part of the feed solution.

3,616,440
DEVICE FOR SERVICING ALUMINA REDUCTION CELLS

Helge O. Forberg, The Dalles; Lloyd H. McKay, The Dalles, and Leland B. Gonderson, Hood River, all of Oreg., assignors to Harvey Aluminum (Incorporated), Torrance, Calif.

Filed Apr. 23, 1968, Ser. No. 725,261
Int. Cl. C23d *3/02*
U.S. Cl. 204—245 4 Claims

A vehicle suitable for use in servicing alumina reduction cells, said vehicle having mounted thereon a power operated crust-breaking device and an alumina storage and handling system, the crust-breaking device comprising a head mounted on an extensible arm which is vertically and horizontally actuatable by hydraulic means, sufficient downward force being exerted by the hydraulic means to cause penetration of the head through the electrolyte crust, the alumina content of the cell being replenished by

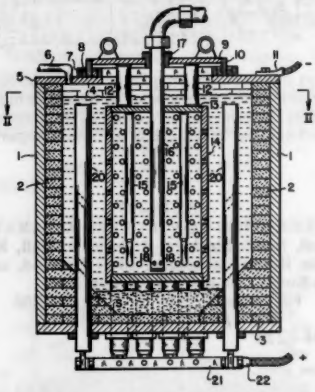


introduction of alumina into the cell from an alumina storage bin on the vehicle.

3,616,441
ELECTROLYTIC CELL ANODES

John C. Priscu, and Eldon R. Poulsen, both of Las Vegas, Nev., assignors to Titanium Metals Corporation of America, West Caldwell, N.J.

Filed Jan. 24, 1969, Ser. No. 793,680
Int. Cl. C22d *3/02*, *3/00*
U.S. Cl. 204—247 5 Claims



An improved anode for use in electrolytic cells for the production of titanium and zirconium, said anode having a plurality of angular passages extending from one face to the diametrically opposite face.

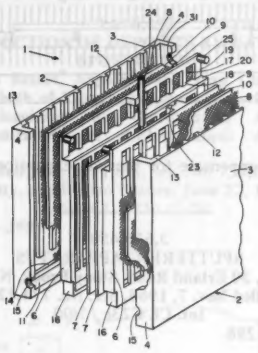
3,616,442
ELECTROCHEMICAL CELL HAVING GAS DIFFUSION ELECTRODE

Wayne S. Cheng, and Peter R. Johnston, both of Neenah, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Dec. 11, 1969, Ser. No. 884,281
Int. Cl. B01k *3/00*; C01b *15/00*
U.S. Cl. 204—257 8 Claims

An electrochemical device particularly including an electrolytic cell adapted for peroxide production. The device has a unitized insert electrode structure for mounting in an

outer electrolyte retaining casing. The unitized insert electrode structure is adapted to provide a dual cell arrangement including planar cathodes each of which has a separate cooperating anode and semipermeable diaphragm.



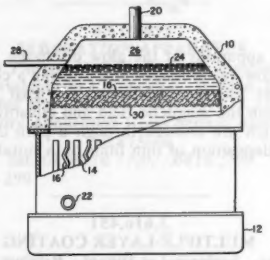
The flow path of electrolyte in each cell is into an anode chamber, through the semipermeable diaphragm to the cathode chamber over the cathode surface and out of the cell.

3,616,443

ABSORPTION OF GASEOUS CELL PRODUCT IN CELL LIQUOR APPARATUS

Edward H. Cook, Jr., and Morris P. Grotheer, both of Lewiston, N.Y., assignors to Hooker Chemical Corporation, Niagara Falls, N.Y.

Filed Aug. 28, 1968, Ser. No. 755,845
Int. Cl. B01k *3/00;* **C01b** *11/26*
U.S. Cl. 204—278 **3 Claims**



The efficiency of electrolytic cells in which a gaseous cell product reacts with a component of the cell liquor or a reagent added to the electrolytic cell, may be substantially improved by the insertion of gas-dispersing means above the electrodes of the electrolytic cell and below the surface of the cell liquors. The dispersing means serves to mechanically diffuse the gaseous cell product into the cell liquor containing the reactant to provide intimate mixing and increased contact of reactants. The gas-dispersing means may be any inert conventional absorption packing or distillation column packing such as, Berl saddles, Raschig rings, bubble trays, glass beads, and the like.

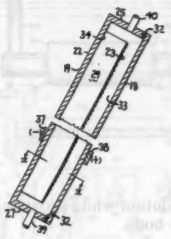
3,616,444

ELECTROLYTIC CELL

Carl W. Raetzsch, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 30, 1969, Ser. No. 795,276
Int. Cl. B01k *1/00*
U.S. Cl. 204—278 **15 Claims**

Disclosed is an electrolytic cell for the continuous production of alkali metal chlorates from alkali metal chlorides having a cathode which includes a pervious plate with a surface that is sloped with respect to the vertical. Electrolysis takes place in the area between the anode end the pervious plate. Gaseous products produced adjacent the



pervious plate are passed immediately through the openings in the pervious plate and out of the electrolizing area, thereby preventing gas blinding of the electrodes and producing circulation and back mixing of the solution within the cell.

3,616,445

TITANIUM OR TANTALUM BASE ELECTRODES WITH APPLIED TITANIUM OR TANTALUM OXIDE FACE ACTIVATED WITH NOBLE METALS OR NOBLE METAL OXIDES

Giuseppe Bianchi, Milan, Italy; Vittorio DeNora, Nassau, Bahamas; Patrizio Gallone, and Antonio Nidola, Milan, Italy, assignors to Electronor Corporation, Chiasso, Switzerland

Filed Dec. 14, 1967, Ser. No. 690,407
Int. Cl. C01d *1/08*
U.S. Cl. 204—290 F **10 Claims**

Describes a titanium or tantalum base electrode having a protective and electrocatalytic layer applied to the faces exposed to the electrolyte, said protective and electrocatalytic layer consisting of mixtures of solid solutions of valve metal oxides and platinum group and noble metals as such or in the form of oxides and/or oxyhalides.

3,616,446

METHOD OF COATING AN ELECTRODE

Bernard J. DeWitt, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 28, 1969, Ser. No. 811,615
Int. Cl. B01k *3/06*
U.S. Cl. 204—290 F **6 Claims**

The novel anode may be used in the electrolysis of an aqueous solution such as of alkali metal chloride. The anode includes a base member having a conductive coating or surface comprising an oxy-compound of a platinum group metal such as ruthenium and an alkaline earth metal, typically calcium, or a rare earth metal such as lanthanum.

3,616,447

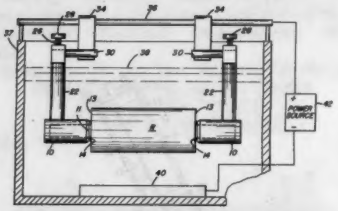
APPARATUS FOR SUSPENDING A BODY IN A CORROSIVE SOLUTION

John W. Hayford, and William M. Tucker, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 21, 1969, Ser. No. 792,508
Int. Cl. C23b *5/70*
U.S. Cl. 204—297 **1 Claim**

A fixture for suspending a body having shafts in a corrosive

solution wherein the fixture protects the shafts from contact by the corrosive solution while providing a path for the flow of electricity to the body.

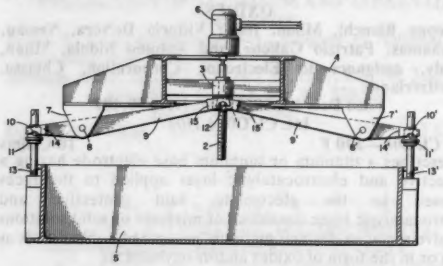


3,616,448

SETTING DEVICE FOR ADJUSTING BY MEANS OF LEVERS THE INFRAELECTRODIC DISTANCES IN AN AMALGAM CELL HAVING A MERCURY CATHODE AND GRAPHITE ANODES

Giuseppe Rossi, Mantova; Renato Fava, Mantova; Giordano Cimarosti, Roverbella, and Sandro Vergari, Mantova, all of Italy, assignors to Montecatini Edison S.p.A., Milan, Italy

Filed Mar. 18, 1969, Ser. No. 808,215
Claims priority, application Italy, Feb. 21, 1968, 14226 A/68
Int. Cl. C23b *5/70*
U.S. Cl. 204—297 **6 Claims**



This application relates to a device for adjusting the infraelectrodic distances in an electrolytic amalgam cell having a mercury cathode and graphite anodes and consisting of a cell tank with electrically insulated side supports for supporting an anode-carrying frame, the device consisting of a threaded bushing threadedly coupled to an adjusting shaft drivable in a conventional manner, said adjusting shaft turning idly within at least one other supporting bushing rigidly connected to the anode-carrying frame, and being axially constrained with respect to the supporting bushing, said frame being provided with two lateral rests each one having a hinge restraining at an intermediate point a lever constrained at its two ends, by hinges permitting rotations and limited horizontal displacements, to said supports arranged on the sides of the cell tank, and to said threaded bushing. Preferably there are at least two such devices.

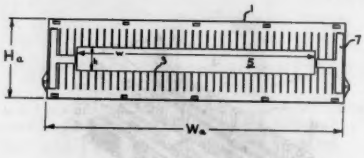
3,616,449

SPUTTERING ANODE

Oscar Pellegrin, Rochester, N.Y., assignor to The Bendix Corporation

Filed Mar. 30, 1970, Ser. No. 23,552
Int. Cl. C23c *15/00*
U.S. Cl. 204—298 **4 Claims**

An anode particularly adapted to a sputtering system for processing large quantities of substrates. The anode comprises a large rectangular plate having a rectangular aperture therein and a plurality of slots extending from the aperture to compensate for thermal expansion and prevent buckling.

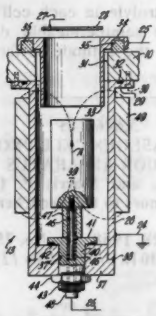


3,616,450

SPUTTERING APPARATUS

Peter J. Clark, 30 Erland Road, Stony Brook, N.Y.

Filed Nov. 7, 1968, Ser. No. 774,126
Int. Cl. C23c *15/00*
U.S. Cl. 204—298 **13 Claims**



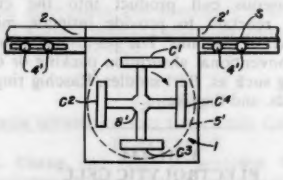
Sputtering apparatus of the glow discharge type operable at relatively low gas pressures and utilizing a combination of magnetic and electric fields and at least one cathode disposed within the magnetic field and constituting a source of atoms which are emitted through a path defined by the cathode for deposition of thin films on a suitable supporting surface.

3,616,451

MULTIPLE-LAYER COATING

Pierre Gallez, Sorinnes-Les-Dinant, Belgium, assignor to Glaverbel, Watermael-Boitsfort, Belgium

Filed Sept. 27, 1967, Ser. No. 670,853
Claims priority, application Luxembourg, Oct. 5, 1966, 52.106
Int. Cl. C23c *15/00*
U.S. Cl. 204—298 **18 Claims**



A method and apparatus for coating at least part of a surface of an article in vacuo, in a deposition chamber in which the vacuum is maintained during and between coating operations, the surface to be coated being maintained in a coating position during each coating operation and different coating materials being provided by different sources

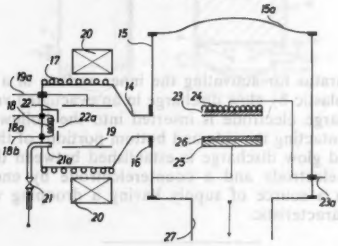
disposed on a carrier in the chamber, the carrier being displaceable for moving each source in succession into an operative position where emission of material from the source will produce a coating layer on the surface at the coating position.

3,616,452

PRODUCTION OF DEPOSITS BY CATHODE SPUTTERING

Jean Jacques Bessot, Arpajon, and Jean Claude Burlurut, Versailles, both of France, assignors to Societe Anonymey, Societe Alsacienne de Construction Atomiques de Telecommunications et d'Electronique Alcatel, Paris, France

Filed June 21, 1968, Ser. No. 739,029
Claims priority, application France, June 22, 1967, 111,571
Int. Cl. C23c *15/00*
U.S. Cl. 204—298 **3 Claims**



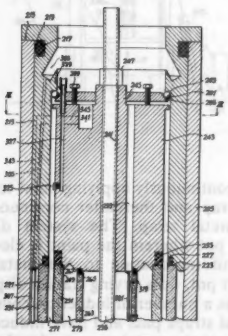
The invention eliminates the drawbacks of the prior methods for cathode-sputtering deposition by providing basically the use of a substantially neutral plasma adapted to be carried in the form of a stable parallel beam to a substantial distance from the source without resorting to intricate electrode arrangements.

3,616,453

SEPARATION APPARATUS

John St. Leger Philpot, Oxford, England, assignor to National Research Development Corporation, London, England

Filed Mar. 20, 1967, Ser. No. 624,327
Claims priority, application Great Britain, Mar. 23, 1966, 12,875/66
Int. Cl. B01d *13/02*; **B01k** *5/00*
U.S. Cl. 204—299 **26 Claims**



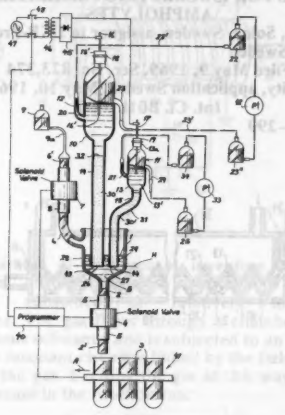
The invention relates to separation apparatus, which utilizes an annular chamber extending between outer and inner walls of which at least the outer wall is continuously rotated to provide across the annular chamber a stabilizing field inhibiting mixing between laminae of fluid flowing along the annular chamber.

3,616,454

METHOD OF AND APPARATUS FOR ELECTROPHORETIC SEPARATION IN A GEL COLUMN

Milton Levy, Long Island City, and Isaac Schenkein, New York, both of N.Y., assignors to New York University, New York, N.Y.

Filed Mar. 13, 1969, Ser. No. 806,931
Int. Cl. B01k *5/00*
U.S. Cl. 204—299 **6 Claims**



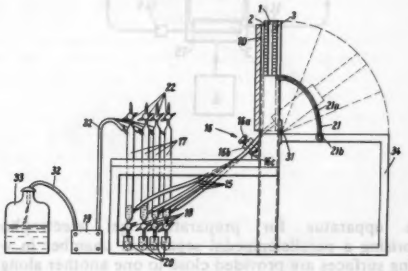
Method of and apparatus for the preparative gel electrophoresis of a specimen wherein the specimen is placed at the upper end of a polyacrylamide gel column of an electrophoresis gel whose lower end terminates at a receptacle containing an elution solution, an electrical potential of a magnitude sufficient to effect migration of components of the specimen to the lower end of said column is applied thereacross, and the solution is periodically drained from the receptacle and fresh elution buffer in corresponding quantities is introduced while the electrophoresis current is cut off. The column is supported on a layer of open-pore high-wet-strength paper.

3,616,455

ELECTROPHORETIC SEPARATION APPARATUS

Philipp Adolf Von Munchhausen, Grolmanstr. 44-45, 1 Berlin, 12, Germany

Filed Mar. 13, 1969, Ser. No. 808,046
Claims priority, application Germany, May 10, 1968, P 17 67 432.7
Int. Cl. B01k *1/00*
U.S. Cl. 204—299 **12 Claims**



An electrophoretic separation apparatus for the support-free continuous separation of molecular fractions in a buffer solution has a thin flat electrophoresis chamber defined between water-cooled plates through which the mixture of fractions and buffer solution is passed and wherein the

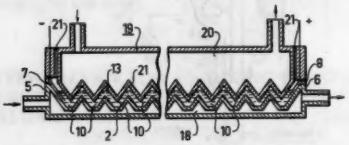
solution is subjected to a unidirectional field transverse to the direction of mass flow to separate the fractions. Subsequently the separated fractions are sedimented out of their respective portions of buffer solution in collecting vessels ahead of the outlets for the solution. Downstream of the collecting vessels is mechanical or hydrostatic pump or flow-control means which makes the fluid flow through the apparatus.

3,616,456

DEVICE FOR ISOELECTRIC SEPARATION OF AMPHOLYTES

Erkki Valmet, Solna, Sweden, assignor to LKB-Produkter AB, Mariehall, Sweden

Filed May 9, 1969, Ser. No. 823,374
Claims priority, application Sweden, May 10, 1968, 6382/68
Int. Cl. B01k *5/00*
U.S. Cl. 204—299 17 Claims



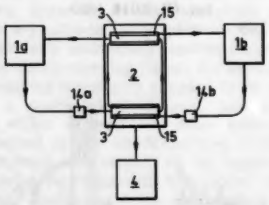
A trough-shaped receptacle with two electrodes inserted therein; the bottom of the receptacle being shaped with projections that divide the receptacle into a plurality of compartments with each compartment having a cooling means in contact with the projection therein.

3,616,457

APPARATUS FOR CARRYING OUT GEL ELECTROLYSIS

Wilhelm Einar Stellan Hjerten; Nils Ivar Leonard Sture Jerstedt, and Arne Wilhelm Kaurin Tiselius, all of Uppsala, Sweden, assignors to LKB-Produkter AB, Mariehall, Sweden

Filed Sept. 19, 1969, Ser. No. 859,406
Claims priority, application Sweden, Sept. 19, 1968, 12,620/68
Int. Cl. B01k *5/00*
U.S. Cl. 204—299 5 Claims



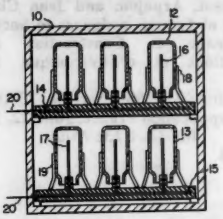
An apparatus for preparative gel electrophoresis comprising a parallelepipedal separation chamber in which cooling surfaces are provided close to one another along two opposite sides of the parallelepiped, these surfaces being shaped so that the gel is mechanically prevented from sliding and so that good cooling is obtained when the gel is cast into the separation chamber and thereafter hardened. This apparatus also comprises normal facilities as elution chamber below the separation chamber and electrodes at both the top and bottom of the separation chamber.

3,616,458

APPARATUS FOR ACTIVATING INTERNAL SURFACES OF PLASTIC HOLLOW ARTICLES

Yosimaro Moriya, 15-23, 4-chome, Omori Kita, Ota-ku, Tokyo-to, Japan

Division of Ser. No. 596,598, Nov. 23, 1966, abandoned.
Filed Dec. 31, 1969, Ser. No. 889,724
No. 889,724
Int. Cl. B01k *1/00*; H01t *19/04*
U.S. Cl. 204—312 3 Claims



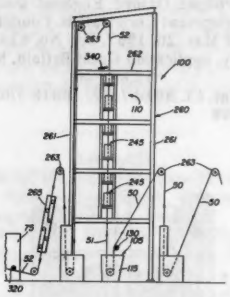
An apparatus for activating the inner surface of a hollow article of plastic by glow discharge in an evacuated vessel. A bare discharge electrode is inserted into the hollow article without contacting the side and bottom portions of the inner surface and glow discharge is established between the bare discharge electrode and a counterelectrode by energizing them from a source of supply having a drooping voltage-current characteristic.

3,616,459

PAINT APPLYING AND DRYING SYSTEM

Richard S. Patton, Flossmoor; Naaman H. Keyser, Hinsdale; Vernon L. Langdon, Tinley Park; Victor D. Beaucaire, Homewood, and Louis A. Marlin, Crestwood, all of Ill., assignors to Interlake Steel Corporation, Chicago, Ill.

Filed Dec. 29, 1969, Ser. No. 888,215
Int. Cl. B01k *5/02*; C23b *13/00*
U.S. Cl. 204—300 26 Claims



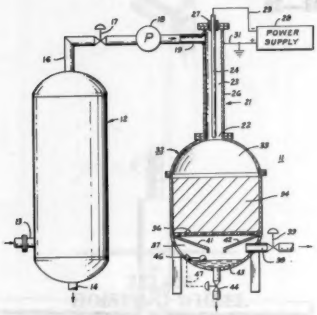
A system for continuously applying paint to a continuously moving metal strap and thereafter continuously drying the paint on the metal strap. The system disclosed herein includes a paint pot wherein the paint is electrophoretically applied as a uniform coating to the metal strap passing through the paint pot, nd a drying station disposed above the paint pot includes a number of induction coils through which the painted metal straps pass and have induced therein eddy currents which heat the metal strap to dry the paint thereon. Means are provided automatically to maintain the level of the paint and the concentration of solids in the paint contained in the paint pot, and means are provided automatically to vary the output from the induction coils in response to the speed and temperature of the metal strap to maintain constant the temperature of the metal strap exiting from the drying station.

3,616,460

ELECTRIC COALESCER

Frederick D. Watson, and Weldon D. Mayse, both of Houston, Tex., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Apr. 9, 1970, Ser. No. 27,019
Int. Cl. B03c 5/02
U.S. Cl. 204—302 9 Claims



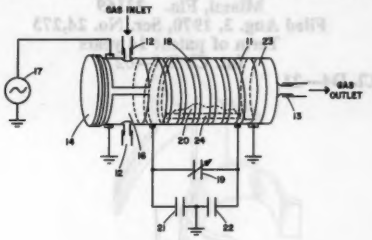
An electric coalescer for removing aqueous liquid droplets dispersed in a hydrocarbon distillate by passage serially through a pretreatment cell having a unidirectional electric field with a gradient in the range from about 20 to about 60 kilovolts per inch between spaced apart electrodes and a container mounting a water-wetted porous material. The porous material, preferably stainless steel wool, provides a residence time to the hydrocarbon distillate of at least about 4 minutes. The electric field gradient is adjusted relative to the mass of porous material so that the liquid droplets coalesce in the porous material to a predetermined degree from the hydrocarbon distillate. A loose mixture of the coalesced liquid droplet phase in the continuous hydrocarbon distillate phase passes from the porous material. A phase separator resolves the loose mixture into a stream of dry hydrocarbon distillate and a second stream comprising the coalesced liquid droplets.

3,616,461

APPARATUS FOR EXCITING A GAS BY MEANS OF AN ELECTRODELESS DISCHARGE

Georges H. Gorin, Waltham, Mass., assignor to LFE Corporation, Waltham, Mass.

Filed Dec. 5, 1969, Ser. No. 882,522
Int. Cl. B01k 1/00
U.S. Cl. 204—312 4 Claims



The apparatus of the present invention is adapted to produce an efficient reaction between a gas and a nongaseous substance at relatively low ambient temperatures. The gas flows through a chamber containing the nongaseous substance and is subjected to an RF field.

A passive resonant circuit is linked by the field through the medium of the gas. Exciting the gas in this way, produces a marked increase in the reaction rate.

ERRATUM

For Class 208—188 see:
Patent No. 3,616,399

3,616,462

ALLYL GLYCIDYL ETHERS

Arthur E. Gurgiolo, and Robert W. McAda, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sept. 3, 1964, Ser. No. 394,301
Int. Cl. C07d 1/18; C08g 23/06
U.S. Cl. 260—348 11 Claims

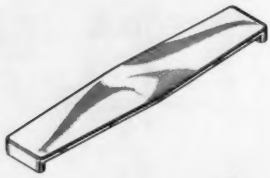
Vulcanizable, rubbery copolymers of propylene oxide are made by the copolymerization of propylene oxide with a glycidyl ether containing an allylic terminal group. At least one oxyalkylene or thioalkylene group intervenes between the glycidyl group and the allylic group of the comonomer.

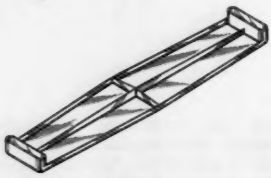
DESIGNS

OCTOBER 26, 1971

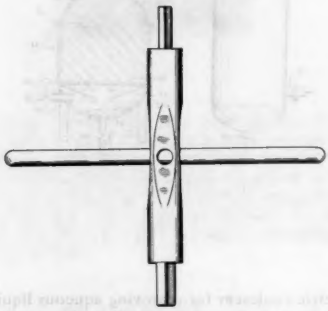
222,423
COMBINED BRUSH AND HAIR LIFT
Anthony Battaglia, 455 NW. 202nd Terrace, Miami, Fla. 33169
Filed Aug. 3, 1970, Ser. No. 24,273
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—21

222,424
HAND SUPPORT FOR PAINTING
Henry J. Perron, 100 SW. 58 Ave., Miami, Fla. 33144
Filed May 13, 1970, Ser. No. 22,959
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—14

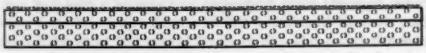




222,425
WRENCH
Franz Palfi, 122 West St., Battle Creek, Mich. 49017
Filed Nov. 9, 1970, Ser. No. 25,899
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—29

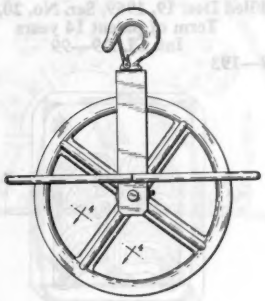


222,426
T-SHAPED HOLLOW FILE
James A. Coon, 929 Drever St., West Sacramento, Calif. 95691, and Elwin Theobald, 4631 Solano Way, Fair Oaks, Calif. 95628
Filed Mar. 13, 1970, Ser. No. 21,900
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—90

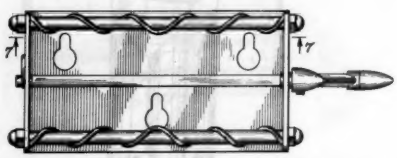


222,427
DOOR HANDLE OR SIMILAR ARTICLE
William G. Deuring, Jr., Pittsfield, Mass., assignor to General Electric Company
Filed Jan. 19, 1970, Ser. No. 20,962
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—161

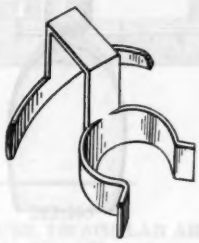
222,428
HOISTING WHEEL
Roy H. Stein, 3920 Zephyr St., Wheat Ridge, Colo. 80033
Filed June 29, 1970, Ser. No. 23,749
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—216



222,429
BANDAGE ROLLER
George W. Nolte, P.O. Box 45, Mullen Road, Whitehouse, N.J. 08888
Filed July 23, 1970, Ser. No. 24,076
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—222



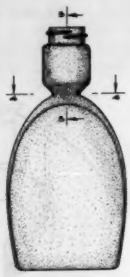
222,430
LAMP SOCKET HOLDER
Alexander Jarvis Millar, 135 Kane Ave., St. James, Assiniboia 12, Manitoba, Canada
Filed Apr. 27, 1970, Ser. No. 22,647
Claims priority, application Canada Feb. 5, 1970
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—259



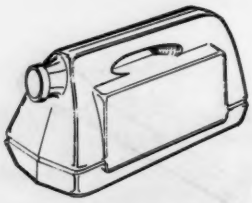
222,431
PIN FOR JACK STAND OR THE LIKE
Sid Lance, 15901 S. Vermont, Gardena, Calif. 90247
Filed July 6, 1970, Ser. No. 23,827
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—265

222,432
WEDGE ANCHOR
Bruce L. Kaufman, Michigan City, Ind., assignor to Phillips Drill Company, Inc., Indianapolis, Ind.
Filed July 20, 1970, Ser. No. 24,029
Term of patent 14 years
Int. Cl. D8—*10*
U.S. Cl. D8—272

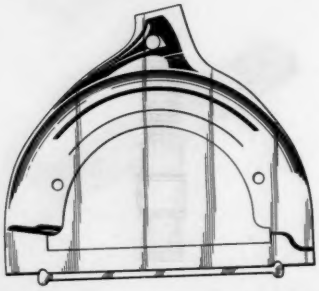
222,433
BOTTLE
Robert J. Donoghue, 900 Windsor, Ave., Windsor, Conn. 06095
Filed Sept. 14, 1970, Ser. No. 24,965
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—115



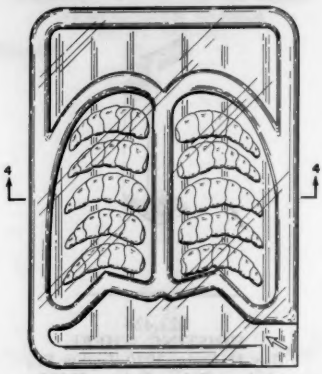
222,434
CONTAINER FOR LIQUIDS
Henry Finkel, Westmount, Quebec, Canada, assignor to Quality Oil Corporation, Montreal, Quebec, Canada
Filed Feb. 26, 1970, Ser. No. 21,643
Term of patent 14 years
Int. Cl. D9—*02*
U.S. Cl. D9—175



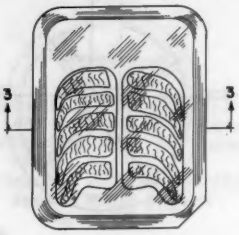
222,435
DISPLAY PACKAGE FOR CIRCULAR CUTTING BLADES OR THE LIKE
Lasher F. Arthur, Haddam, Conn., assignor to Robert T. Reynolds, doing business as Robert T. Reynolds Associates, Newington, Conn.
Filed Aug. 20, 1970, Ser. No. 24,594
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—191



222,436
FROZEN SHRIMP PACKAGE
William P. Kremkau, Greenville, Paul Joonase, Taylors, and Richard R. Perdue, Greenville, S.C., assignors to W. R. Grace & Co., Duncan, S.C.
Filed July 20, 1970, Ser. No. 24,015
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—192

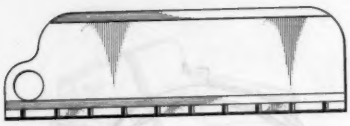


222,437
PACKAGE OF SHRIMP
William P. Kremkau, Paul Joonase, and Richard R. Perdue, Greenville, S.C., assignors to W. R. Grace & Co., Duncan, S. C.
Filed Dec. 19, 1969, Ser. No. 20,573
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—193

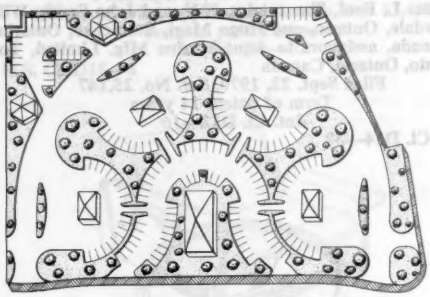


222,438
DISPLAY CARTON OR SIMILAR ARTICLE
Gar Litton, New York, N.Y., assignor to Helena Rubinstein, Inc., New York, N.Y.
Filed Feb. 20, 1970, Ser. No. 21,553
Term of patent 14 years
Int. Cl. D9—*04*
U.S. Cl. D9—224

222,439
POURING ATTACHMENT FOR A PAINT CAN
Frank Itano, 203 Clinton St., Yuba City, Calif. 95991
Filed Apr. 9, 1970, Ser. No. 22,343
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—290

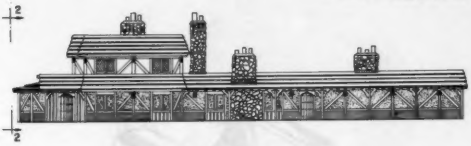


222,440
FREEWAY COMMERCIAL CENTER
Louis Koth Glasbrenner, 440 Arroyo Terrace, Pasadena, Calif. 91100
Filed Dec. 29, 1969, Ser. No. 20,684
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D13—1

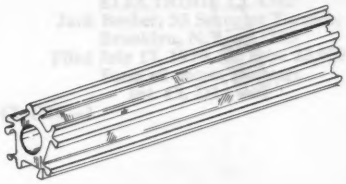


222,441
BUS SHELTER
Richard L. Sklaar, 88 Fairfield Lane, Roslyn Heights, N.Y. 11577
Filed May 15, 1970, Ser. No. 22,996
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D13—1

222,442
BUILDING
Max D. Chapman, 219 Garden Mall, Exchange Park, Dallas, Tex. 75235
Filed Aug. 24, 1970, Ser. No. 24,647
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D13—1



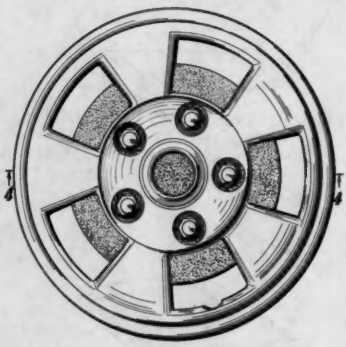
222,443
EXTRUDED TUBE, OR SIMILAR ARTICLE
Leonard W. Szymanski, Niles, Ill., assignor to Lift Parts Mfg. Inc., Elk Grove Township, Ill.
Filed May 14, 1970, Ser. No. 22,981
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—6



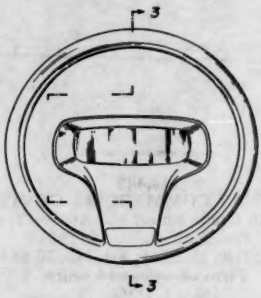
222,444
TAPE RECORDER
Tamao Ikuta, Fujisawa-shi, and Shozo Moriya, Kawasaki-ken, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Sept. 8, 1970, Ser. No. 24,878
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14

222,445
GEAR SHIFT STICK
George H. Hurst, Jr., Jenkintown, and James F. Hobbins, Philadelphia, Pa., assignors to Hurst Performance, Inc., Warminster, Pa.
Filed Jan. 20, 1970, Ser. No. 21,005
Term of patent 7 years
Int. Cl. D12—*16*
U.S. Cl. D14—6

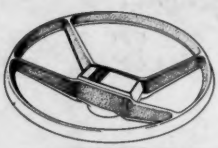
222,446
WHEEL COVER OR SIMILAR ARTICLE
Herbert Buerger, Walton, N.Y. 13856
Filed July 22, 1970, Ser. No. 24,064
Term of patent 7 years
Int. Cl. D12—*16*
U.S. Cl. D14—30



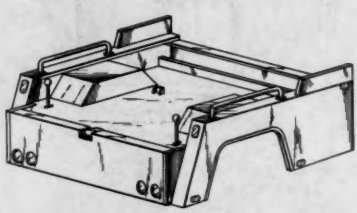
222,447
STEERING WHEEL
Henri Fabien, Bagneux, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France
Filed Aug. 14, 1970, Ser. No. 24,487
Claims priority, application France Feb. 23, 1970
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D14—30



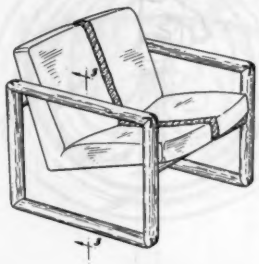
222,448
STEERING WHEEL
Thomas L. Faul, Skaneateles, N.Y. and John Smith, Willowdale, Ontario, and Hugo Magi, Etobicoke, Ontario, Canada, assignors to Aqua-Marine Mfg. Limited, Toronto, Ontario, Canada
Filed Sept. 22, 1970, Ser. No. 25,147
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D14—30



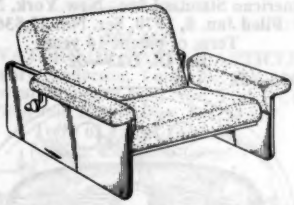
222,449
WRECKER BODY
Edward F. Wegener and Thure H. Wegener, both of South River Road, Cranbury, N.J. 08516
Filed Nov. 10, 1970, Ser. No. 25,917
Term of patent 14 years
Int. Cl. D12—*09*
U.S. Cl. D14—3



222,450
CHAIR OR SIMILAR ARTICLE
John B. Brook, Toronto, Ontario, Canada, assignor to J. & J. Brook Limited, Toronto, Ontario, Canada
Filed Sept. 2, 1969, Ser. No. 18,930
Term of patent 14 years
Int. Cl. D6—*02*
U.S. Cl. D15—1



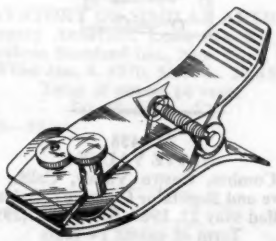
222,451
FURNITURE SEAT
Thomas Larry Lamb, Toronto, Ontario, Canada, assignor to Thomas Lamb & Associates Limited, Toronto, Ontario, Canada
Filed Apr. 13, 1970, Ser. No. 22,402
Claims priority, application Canada Oct. 17, 1969
Term of patent 14 years
Int. Cl. D6—*02*
U.S. Cl. D15—1



222,452
CHAIR
Jose Bonet Bertran, 1 Paseo Carlos, 164 Barcelona, Spain
Filed Apr. 17, 1970, Ser. No. 22,497
Claims priority, application Spain Oct. 21, 1969
Term of patent 7 years
Int. Cl. D14—*02*
U.S. Cl. D15—1

222,453
ARMCHAIR
John W. Ziss, and Frank R. Ziss, both of 6413 E. Sprague Road, Independence, Ohio 44131
Filed June 4, 1970, Ser. No. 23,311
Term of patent 14 years
Int. Cl. D6—*02*
U.S. Cl. D15—1

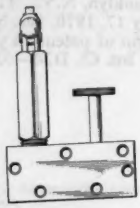
222,454
ELECTRODE CLAMP
Jack Beeber, 35 Seacoast Terrace, Brooklyn, N.Y. 11235
Filed July 17, 1970, Ser. No. 23,989
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D16—1



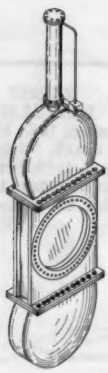
222,455
FISH LURE
Jack H. Masters, 1053 Riverside Drive, Battle Creek, Mich. 49015
Filed Feb. 2, 1970, Ser. No. 21,193
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

222,456
TRANSPARENT FISH ATTRACTOR
Robert G. Fay, 5634 Cielo Ave., Goleta, Calif. 93017
Filed June 15, 1970, Ser. No. 23,499
Term of patent 14 years
Int. Cl. D22—*07*
U.S. Cl. D22—30

222,457
PUMP
Watt B. Bair, 11255 Camarillo St., North Hollywood, Calif. 91602
Filed Feb. 9, 1970, Ser. No. 21,341
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—14

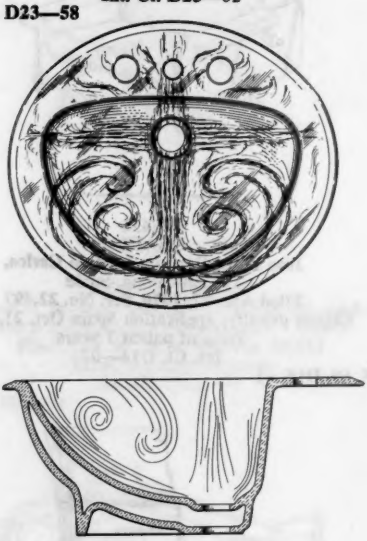


222,458
GATE VALVE
Marvin G. Combes, Castro Valley, Calif., assignor to Grove Valve and Regulator Company, Oakland, Calif.
Filed May 23, 1969, Ser. No. 17,299
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19

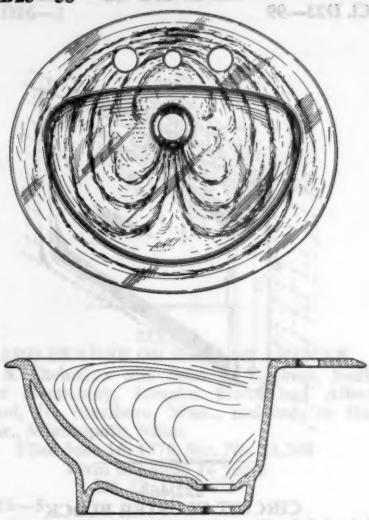


222,459
YARD HYDRANT HEAD
Noel M. Anderson, P.O. Box 392, Storm Lake, Iowa 50588
Filed July 15, 1970, Ser. No. 23,962
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—32

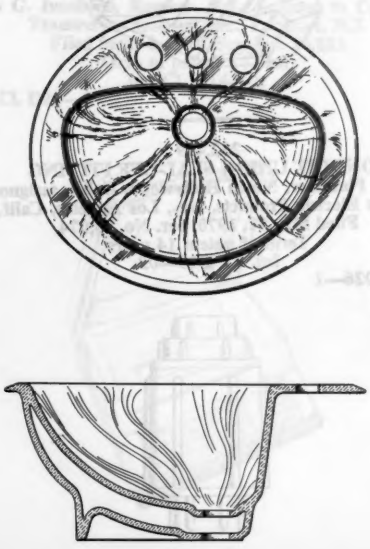
222,460
LAVATORY OR SIMILAR ARTICLE
Warren Gregory Anderson, Louisville, Ky., assignor to American Standard Inc., New York, N.Y.
Filed Jan. 8, 1970, Ser. No. 20,836
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58



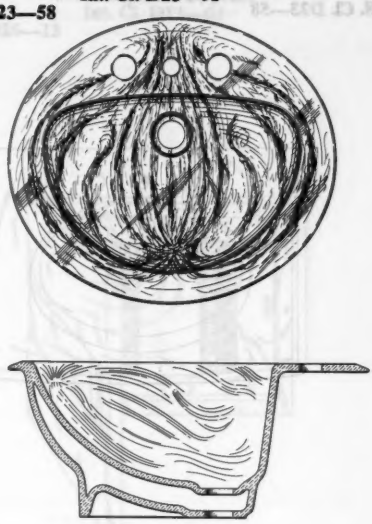
222,461
LAVATORY OR SIMILAR ARTICLE
Warren Gregory Anderson, Louisville, Ky., assignor to American Standard Inc., New York, N.Y.
Filed Jan. 8, 1970, Ser. No. 20,840
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58



222,462
LAVATORY OR SIMILAR ARTICLE
Warren Gregory Anderson, Louisville, Ky., assignor to American Standard Inc., New York, N.Y.
Filed Jan. 8, 1970, Ser. No. 20,837
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58

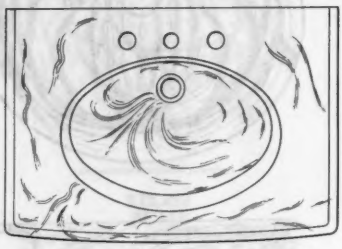


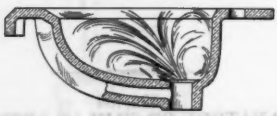
222,463
LAVATORY OR SIMILAR ARTICLE
Warren Gregory Anderson, Louisville, Ky., assignor to American Standard Inc., New York, N.Y.
Filed Jan. 8, 1970, Ser. No. 20,838
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58



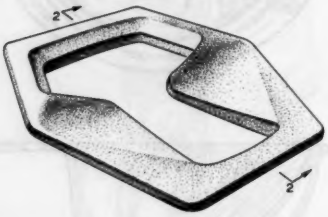
222,464
LAVATORY OR SIMILAR ARTICLE
Warren Gregory Anderson, Louisville, Ky., assignor to American Standard Inc., New York, N.Y.
Filed Jan. 8, 1970, Ser. No. 20,839
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58

222,465
LAVATORY OR SIMILAR ARTICLE
Warren Gregory Anderson, Louisville, Ky., assignor to American Standard Inc., New York, N.Y.
Filed Jan. 26, 1970, Ser. No. 21,082
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58

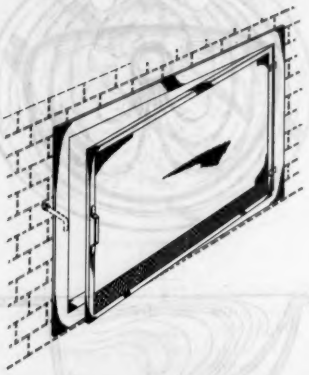




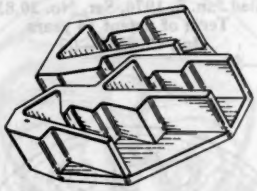
222,466
TOILET SEAT
Hugo Magi, Etobicoke, Ontario, Canada, assignor to Aqua-Marine Mfg., Limited, Toronto, Ontario, Canada
Filed Apr. 8, 1970, Ser. No. 22,312
Term of patent 3½ years
Int. Cl. D23—*02*
U.S. Cl. D23—71



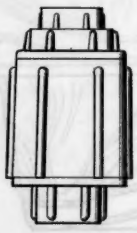
222,467
COMBINED FIREPLACE SCREEN AND FRAME THEREFOR
Paul H. Casper, Phoenix, Ariz. (P.O. Box 239, Springerville, Ariz. 85938)
Filed June 10, 1970, Ser. No. 23,416
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—99



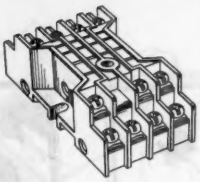
222,468
CIRCUIT CLUSTER BLOCK
Michael John Reynolds, Tring, England, assignor to AMP Incorporated, Harrisburg, Pa.
Filed Apr. 13, 1970, Ser. No. 22,387
Claims priority, application Great Britain Nov. 6, 1969
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1



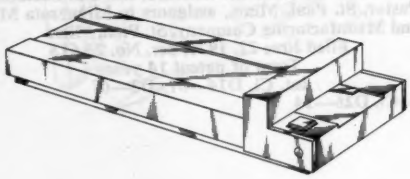
222,469
CONDUIT UNION SEAL-OFF FITTING
Merle A. Plummer, North Hollywood, Calif., assignor to Myers Electric Products, Inc., Los Angeles, Calif.
Filed May 21, 1970, Ser. No. 23,074
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1



222,470
SOCKET FOR RELAY
Teizo Fujita and Masao Kikuchi, Osaka, Japan, assignors to Izumi Denki Company Limited, Osaka, Japan
Filed July 21, 1970, Ser. No. 24,245
Claims priority, application Japan Feb. 2, 1970
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1

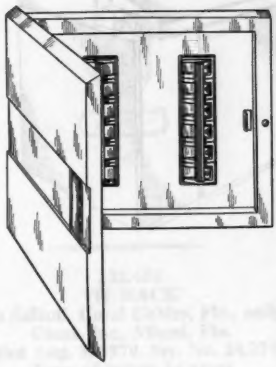


222,471
CARD READER OR SIMILAR ARTICLE
Michael S. Shebanow and John F. Graham, Sudbury, Helmut Henneberg, Jamaica Plain, and Albert J. Michaud, Jr., Marlboro, Mass., assignors to Honeywell Inc., Minneapolis, Minn.
Filed June 16, 1970, Ser. No. 23,509
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. 26—5

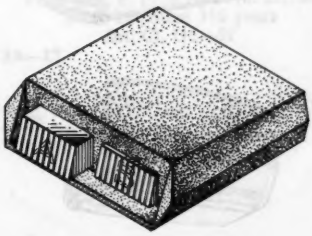


222,472
PORTABLE DATA COMMUNICATION TERMINAL
Allen G. Jacobson, Ramsey, N.J., assignor to Computer Transceiver Systems, Inc., Paramus, N.J.
Filed Sept. 4, 1970, Ser. No. 24,833
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5

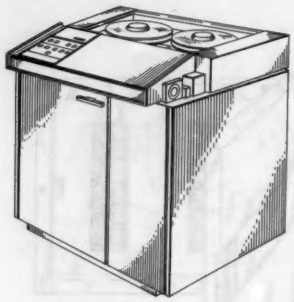
222,473
ELECTRIC CONTROL PANEL BOARD
Giuseppe Zecca, Via Monte Tabor 16, Varese, Italy
Filed June 16, 1970, Ser. No. 23,521
Claims priority, application Italy Jan. 10, 1970
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—13



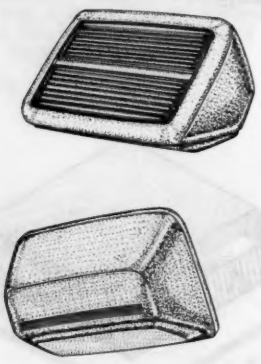
222,474
COAXIAL SWITCH
John R. Thompson, North Hollywood, Calif., assignor to Electronic Industrial Engineering, Inc., North Hollywood, Calif.
Filed Aug. 26, 1970, Ser. No. 24,703
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—13



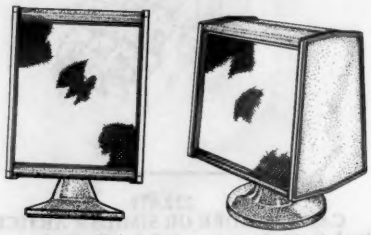
222,475
MAGNETIC TAPE-TO-TAPE CONVERTER
George H. Blesch, Cleve M. Hart, Ben Lomond and Morton D. Lenske, Cupertino, and James C. Jimerson, San Jose, Calif., assignors to Litton Systems, Inc., Beverly Hills, Calif.
Filed May 13, 1970, Ser. No. 22,956
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14



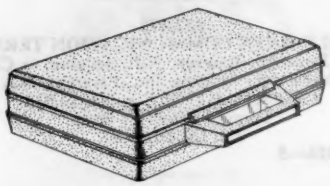
222,476
SPEAKER ENCLOSURE FOR A MAGNETIC TAPE PLAYER OR SIMILAR ARTICLE
Yoshihiko Ohyama and Yoshikuni Ohira, Tokyo, Japan, assignors to Hitachi Ltd., Tokyo, Japan
Filed May 18, 1970, Ser. No. 23,045
Claims priority, application Japan Nov. 17, 1969
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14

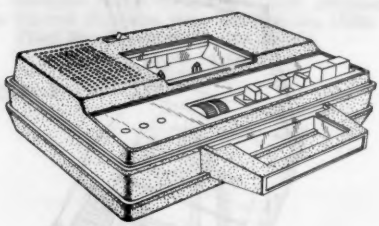


222,477
SPEAKER HOUSING
Hideo Wada, Chigasaki, Sukeyoshi Nashinoki, Yokohama, and Itsuo Kato and Tsutomu Murakami, Tokyo, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Sept. 14, 1970, Ser. No. 24,961
Claims priority, application Japan Mar. 13, 1970
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14

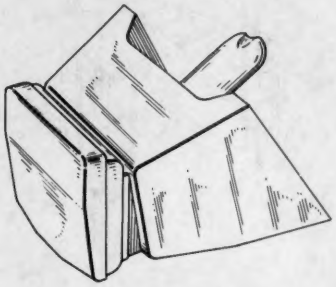


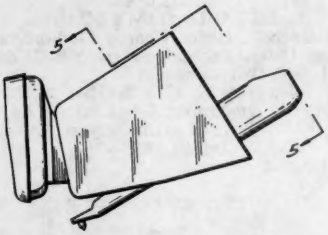
222,478
PORTABLE TAPE RECORDER
Raymond A. Massaccesi, Lombard, Ill., and Sheldon Lee Pastor, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed June 22, 1970, Ser. No. 23,613
Term of patent 14 years
Int. Cl. D14—*01*; D3—*01*
U.S. Cl. D26—14



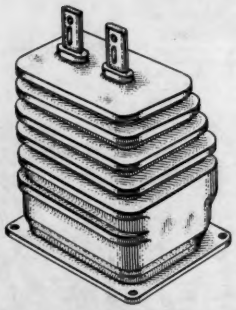


222,479
COMBINED STYLUS UNIT AND STYLUS GUARD THEREFOR
Donald G. Litcher, Commack, N.Y., assignor to Empire Scientific Corporation, Garden City, N.Y.
Filed June 18, 1970, Ser. No. 24,101
Term of patent 14 years
Int. Cl. D14—*99*
U.S. Cl. D26—14

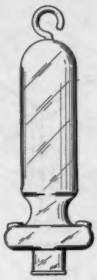




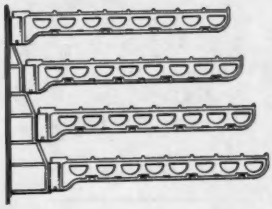
222,480
INSTRUMENT TRANSFORMER
Robert S. Canney, Berwick, Maine, assignor to General Electric Company
Filed Nov. 25, 1970, Ser. No. 26,151
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. 26—15



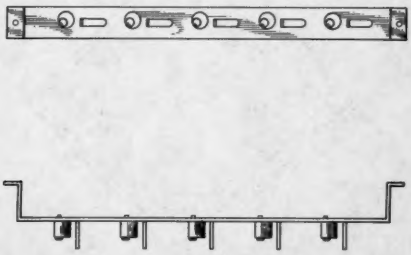
222,481
COMBINED BIRD WATERING FOUNTAIN AND HUMMING BIRD FEEDER
Robert Rakowski, 3411 Rosalie Ave., Baltimore, Md. 21234
Filed Dec. 10, 1970, Ser. No. 26,394
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—14



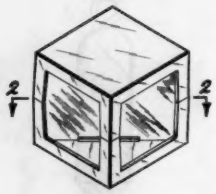
222,482
TIE RACK
Goodwin Salkoff, Coral Gables, Fla., assignor to Cosas, Inc., Miami, Fla.
Filed Aug. 3, 1970, Ser. No. 24,274
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D33—8



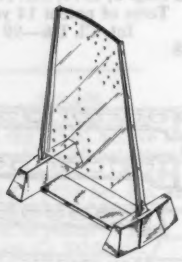
222,483
BRACKET FOR HOLDING FISHING RODS
Richard L. Plath, 2038 15th St. NW., Rochester, Minn. 55901
Filed Mar. 6, 1970, Ser. No. 21,760
Term of patent 3½ years
Int. Cl. D6—*01*
U.S. Cl. 33—17



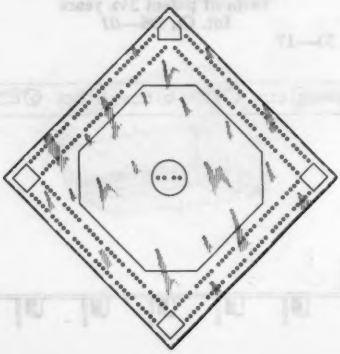
222,484
GAME PIECE OR THE LIKE
Aaron G. Cohen, Los Angeles, Calif., and David T. Okada and Dermot F. Sims, Piscataway, N.J., assignors to Mattel, Inc., Hawthorne, Calif.
Filed May 4, 1970, Ser. No. 22,786
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5



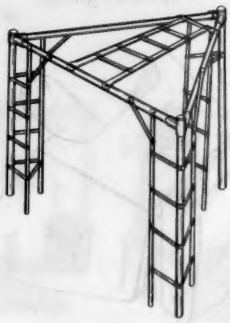
222,485
GAME BOARD
Perry J. Grant, Pacific Palisades, Calif., assignor to Reuben Klamer, doing business as Reuben Klamer Associates, Beverly Hills, Calif.
Filed May 8, 1970, Ser. No. 22,890
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5



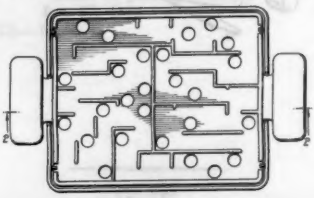
222,486
CRIBBAGE BOARD
Spencer M. Wagnild, 3661 34th Ave. S., Minneapolis, Minn. 55406
Filed May 25, 1970, Ser. No. 23,124
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5



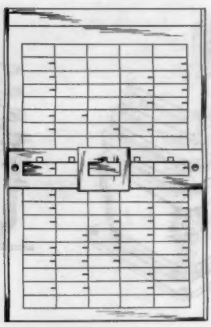
222,487
PLAYGROUND CLIMBER
Erwin N. Korte, Carbondale, Ill., assignor to Turco Manufacturing Company, Du Quoin, Ill.
Filed June 4, 1970, Ser. No. 23,322
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5



222,488
TILTABLE GAME BOARD
Manfred Rocholl, Dieter Konrad Gutbrod, and Leslie Warnett, Ilkley, England, assignors to Middleton Export Limited, Ilkley, England
Filed Sept. 29, 1970, Ser. No. 25,253
Claims priority, application Great Britain July 16, 1970
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5

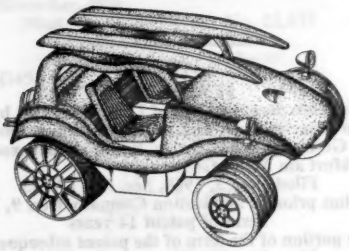


222,489
GAME BOARD
Eugene H. Primoff, 15 Whitefield Terrace, New Rochelle, N.Y. 10801
Filed Nov. 25, 1970, Ser. No. 26,155
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5

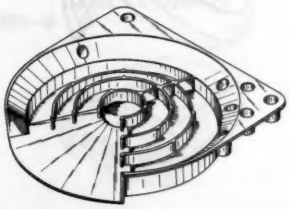


222,490
PLAYING CARD
St. Barth Alaska, 3811 S. Scoville Ave., Berwyn, Ill. 60402
Filed May 1, 1970, Ser. No. 22,777
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—13

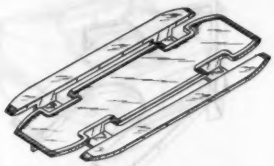
222,491
TOY AMPHIBIOUS VEHICLE
Arthur R. Gorfain, Fair Lawn, N.J., assignor to Cragstan Industries, Inc., New York, N.Y.
Filed Apr. 15, 1970, Ser. No. 22,441
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15



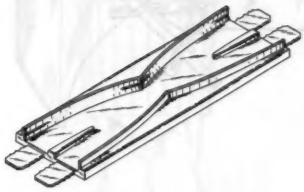
222,492
GAME ACCESSORY FOR USE WITH SPINNING TOYS
Anthony D. Miller, Torrance, and John T. Benson, Los Angeles, Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed July 23, 1970, Ser. No. 24,080
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15



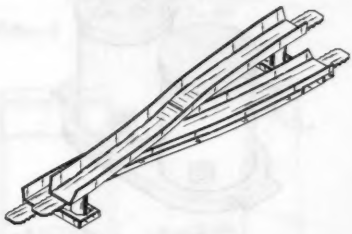
222,493
TOY TRACK SECTION CONNECTOR
Raymond J. Douglas, Lomita, and William A. Staats, Torrance, Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Aug. 20, 1970, Ser. No. 24,598
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15



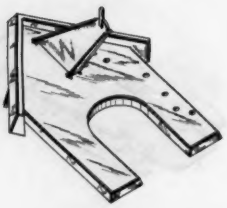
222,494
CROSSOVER TRACK SECTION
Janos Beny, Manhattan Beach, and Toshio Yamasaki, Gardena, Calif., assignor to Mattel, Inc., Hawthorne, Calif.
Filed Aug. 25, 1970, Ser. No. 24,688
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15



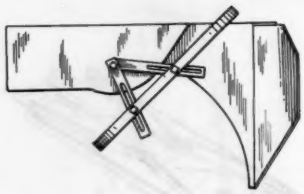
222,495
CROSSOVER TRACK SECTION
Homer S. Davis, Los Angeles, and Emerson W. Brigham, Jr., Hermosa Beach, Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Aug. 25, 1970, Ser. No. 24,687
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15



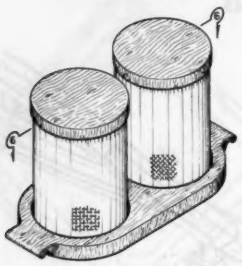
222,496
DISPLAY STAND FOR A TOY
Joseph G. Sojka, Melrose Park, Ill., assignor to Mattel, Inc., Hawthorne, Calif.
Filed Sept. 24, 1970, Ser. No. 25,561
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15



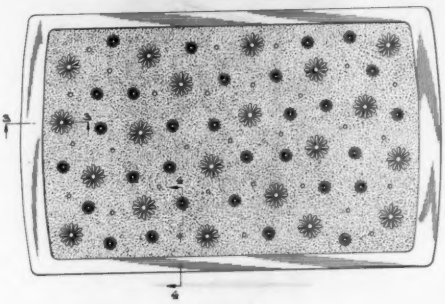
222,497
DISTRIBUTOR SPOUT FOR GRAIN AND SILAGE
Melvin E. Dreier, Dumont, Iowa 50625
Filed Feb. 9, 1970, Ser. No. 21,344
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D40—1



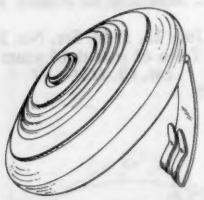
222,498
COMBINED BREAD CANISTERS AND SUPPORTING TRAY THEREFOR
Henrietta M. Gould, Davis County, Utah (1308 S. 200 W., Apt. 3, Bountiful Utah 84010)
Filed June 10, 1970, Ser. No. 23,425
Term of patent 7 years
Int. Cl. D7—*06*
U.S. Cl. D44—6



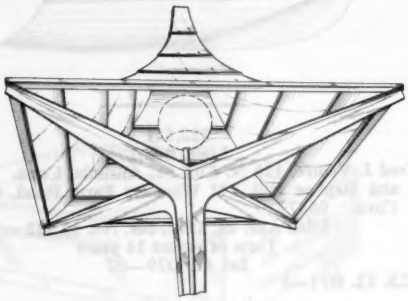
222,499
BATH MAT
Charles A. Wells, Coshocton, Ohio, assignor to Pretty Products, Inc., Coshocton, Ohio
Filed Sept. 4, 1970, Ser. No. 25,032
Term of patent 14 years
Int. Cl. D6—*11;* D7—*99*
U.S. Cl. D44—31



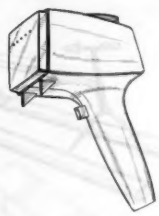
222,500
FLASHLIGHT
Hans Gugelot, deceased, late of Ulm, Germany, by Marie-Helen Gugelot, heir, and Franz Preisinger, Oberelchingen, Germany, assignors to Braun Aktiengesellschaft, Frankfurt am Main, Germany
Filed June 3, 1969, Ser. No. 17,563
Claims priority, application Germany Dec. 9, 1968
Term of patent 14 years
The portion of the term of the patent subsequent to Mar. 31, 1984, has been disclaimed
Int. Cl. D26—*02*
U.S. Cl. D48—24



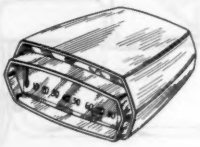
222,501
CANOPY FOR EXTERIOR LIGHTING FIXTURES OR THE LIKE
John O. Simonds, 17 Penhurst Road 15202; Philip D. Simonds, Brightwood Trail 15237; and Geoff Rausch, 101 Thompson Drive 15229, all of Pittsburgh, Pa.
Filed Sept. 15, 1969, Ser. No. 19,322
Term of patent 14 years
Int. Cl. D26—*03*
U.S. Cl. D48—31



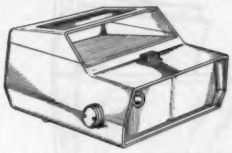
222,502
STEAM GENERATING APPLIANCE FOR REMOVING WRINKLES FROM CLOTH ARTICLES
Alfred W. Madl, Glendale, Wis., and John M. Kupiec, Brooklyn, N.N.Y., assignors to John Oster Manufacturing Co., Milwaukee, Wis.
Filed May 6, 1970, Ser. No. 22,831
Term of patent 14 years
Int. Cl. D15—*05;* D23—*99*
U.S. Cl. D49—13



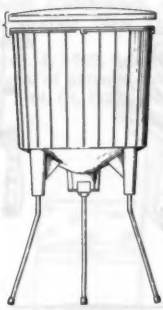
222,503
TACHOMETER
George E. Smith, Kansas City, Mo., assignor to Midland International Corporation, Kansas City, Mo.
Filed July 13, 1970, Ser. No. 23,920
Term of patent 14 years
Int. Cl. D10—*10*
U.S. Cl. D52—6



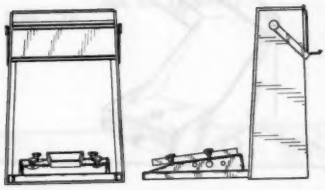
222,504
ELECTRONIC THERMOMETER READ-OUT HOUSING
Stephens N. Sato, San Diego, Calif., assignor to Ivac Corporation, San Diego, Calif.
Filed Aug. 6, 1970, Ser. No. 24,337
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D52—7



222,505
RACK FOR COLLECTING AND DISPENSING LIQUID
William G. Carr, Brooklyn, N.Y., assignor to Stamco, Inc., Levittown, N.Y.
Filed June 29, 1970, Ser. No. 23,751
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D55—1

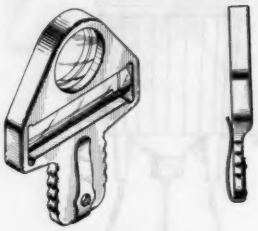


222,506
HOUSING FOR AN ELECTRONIC MUSICAL TONE SYNTHESIZER OR SIMILAR ARTICLE
Coles A. Doty, Glenview, Ill., assignor to Ludwig Industries, Chicago, Ill.
Filed Sept. 18, 1970, Ser. No. 25,066
Term of patent 14 years
Int. Cl. D17—*99*
U.S. Cl. D56—1



222,507
PHONOGRAPH CABINET
Robert A. O'Neil, Glen Ellyn, Ill., assignor to The Seeburg Corporation of Delaware, Chicago, Ill.
Filed Aug. 12, 1970, Ser. No. 24,456
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D56—4

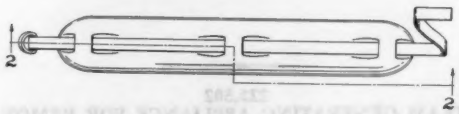
222,508
MULTI-PURPOSE POCKET MAGNIFIER
Jacob Krebs, 2445 Fairmount Ave., Philadelphia, Pa. 19130
Filed Nov. 23, 1970, Ser. No. 26,123
Term of patent 3½ years
Int. Cl. D16—*08*
U.S. Cl. D57—1



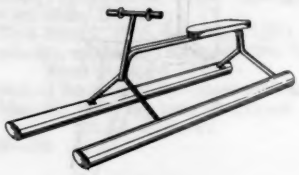
222,509
REAR PROJECTION VIEWER
William A. Andres, Hopkins, Larry F. Becker, Brooklyn Park, and Larry D. Quanrud, Golden Valley, Minn., assignors to Washington Scientific Industries, Inc., Long Lake, Minn.
Filed Nov. 25, 1970, Ser. No. 26,168
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D61—1

222,510
BOAT HULL WITH GLIDING POOP
Cosimo Centaro, Via Monterosa 35, Turin, Italy
Filed May 20, 1970, Ser. No. 23,070
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D71—1

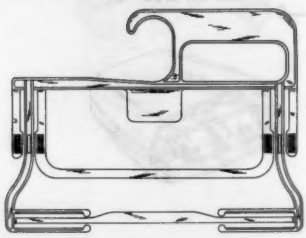
222,511
LIFE BELT
Fred J. Ventre, 120 N. Cliff St., Ansonia, Conn. 06401, and Stephen Hill, 691 Wheelers Farm Road, Orange, Conn. 06477
Filed Apr. 20, 1970, Ser. No. 22,522
Term of patent 14 years
Int. Cl. D29—*02*
U.S. Cl. D71—1



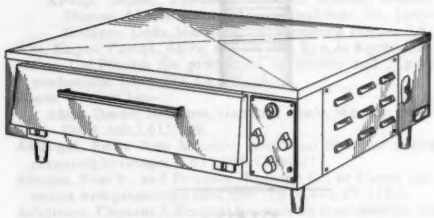
222,512
WATER SCOOTER
Clarence R. Lennox, 7032 82nd St., Edmonton, Alberta, Canada
Filed July 14, 1970, Ser. No. 23,947
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D71—1



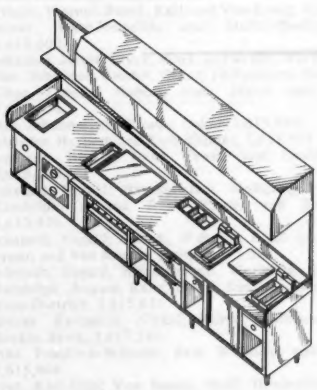
222,513
TROUSERS HANGER
Robert L. Hart, Manhasset Hills, and Marc Zuckerman and Albert Tangredi, Bayside, N.Y., assignors to W. R. Grace & Co., Duncan, S.C.
Filed Aug. 3, 1970, Ser. No. 24,277
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D80—8



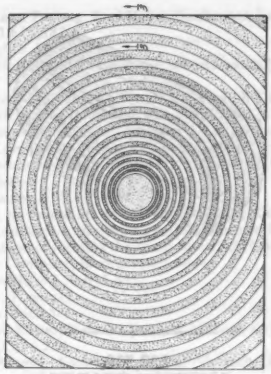
222,514
ELECTRIC OVEN
Stanley V. Joeckel, Wayne, N.J., assignor to Irex Corporation, Riverdale, N.J.
Filed Sept. 2, 1970, Ser. No. 24,818
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D81—4



222,515
FOOD PREPARATION COUNTER
George R. Goetz, Bloomington, Minn., assignor to American Dairy Queen Corporation
Filed Mar. 3, 1970, Ser. No. 21,712
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D81—10



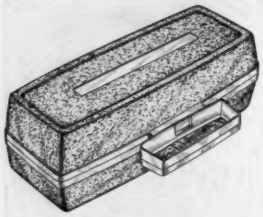
222,516
STERILIZATION INDICATOR
Arthur W. Kelson, New York, N.Y., assignor to Propper Manufacturing Co., Inc., Long Island City, N.Y.
Filed Aug. 31, 1970, Ser. No. 24,768
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D83—1



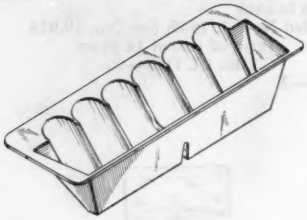
222,517
CIGARETTE CASE
Georg Reitzel, Gelnhausen, Germany, assignor to Drescher & Kiefer, Gelnhausen, Germany, and Randolph-Rand Corporation, New York, N.Y., fractional part interest to each
Filed Nov. 4, 1969, Ser. No. 19,926
Term of patent 14 years
Int. Cl. D27—*06*
U.S. Cl. D85—2

222,518
FALSE EYELASH APPLICATOR
David C. Brittain, Memphis, Tenn., assignor to Plough, Inc., Memphis, Tenn.
Filed June 29, 1970, Ser. No. 23,728
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10

222,519
CARRYING CASE FOR ELECTRIC HAIR CURLERS
Kiyoshi Kudo, Nagoya, Japan, assignor to Sunbeam Corporation, Chicago, Ill.
Filed June 30, 1970, Ser. No. 23,772
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D86—10

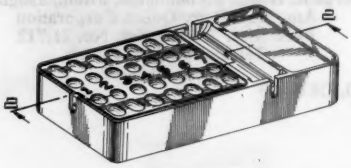


222,520
LIPSTICK HOLDER
Merwin A. Caine, R.F.D. 1, Box 218, Jackson, N.J. 08527
Filed Aug. 3, 1970, Ser. No. 24,618
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D86—10



222,521
VACUUM BOTTLE
Craig A. Johnson, 205 Overby Drive, Antioch, Tenn. 37013
Filed Sept. 24, 1970, Ser. No. 25,576
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D44—1

222,522
LOCKSMITH'S TRAY FOR HOLDING LOCK PARTS
William E. Zipf, Franklin County, Ohio, assignor to Zipf Lock Company, Columbus, Ohio
Filed Sept. 30, 1970, Ser. No. 25,273
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D87—1



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 26TH DAY OF OCTOBER, 1971

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

AB Tetra Pak: *See—*
Tuma, Alex; and Hansson, Jan Ingvar, 3,615,823.

Abbott, John R.; and Coffey, William F., to Eastman Kodak Company. Silver halide emulsions containing 3-cyclicamino- 5-pyrazolone color couplers. 3,615,506, Cl. 96-56.5

Abbott Laboratories: *See—*
Crovetti, Aldo J.; Kenney, Donald S.; and Hasbrouck, Richard B., 3,615,745.

Abe, Masahiro: *See—*
Kawaji, Shohei; Kawasaki, Toyoaki; Murase, Masao; Fukatsu, Shunzo; Abe, Masahiro; Koaze, Yoshihisa; Ito, Tatsuo; Suzuki, Mamoru; Ueda, Masahiro; and Umezawa, Hamao,3,616,243.

Abe, Shigeo; Furuya, Akira; and Okachi, Ryo, to Kyowa Hakko Kogyo Co., Ltd.Process for production of inosine and 5'-guanylic acid nucleotides. 3,616,212, Cl. 195-28.

Abele, Werner: *See—*
Klein, Dieter; Heimann, Gerhard; Abele, Werner; and Oosterloo, Gerd. Joh,3,615,509.

Abile-gal, Emile Jean Maurice. Individual filter for preserving and preparing beverages. 3,615,708, Cl. 99-171.

Abrams, Paul S.; and Peterson, Rudolph G., to Carco, Inc. Marking device with pressurized fluid flow. 3,614,940, Cl. 118-3.

Ackerman, Clemens J. Reagent for assaying thyromimetic compounds. 3,616,257, Cl. 195-103.5

Adair, Favian M. Igniter. 3,615,287, Cl. 44-36.

Adamovske strojirny, narodni podnik: *See—*
Jurny, Josef, 3,614,927.

Adamson, David L.; and Tuddenham, William M., to Kennecott Copper Corporation. Method for the electrodeposition of copper powder. 3,616,277, Cl. 204-10.

Addis, Kenneth J., to Deering Milliken Research Corporation. Vibratory method for securing a continuous thread on a support surface. 3,616,001, Cl. 156-177.

Addressograph-Multigraph Corporation: *See—*
Freundlich, Jackson S., 3,616,121.
Hessel, William J., 3,615,411.
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Adin, Nancy Gershman: *See—*
Bruck, Peter; and Adin, Nancy Gershman,3,615,430.

Adler, Franklin P. Hydraulic sway stabilizer. 3,614,931, Cl. 105-199.

Aebi, Peter: *See—*
Widmer, Hans; and Aebi, Peter,3,614,865.

Aelony, David; and McKillip, William J., to Ashland Oil, Inc. Method for the purification of malononitrile by the addition of cyclopentadiene followed by distillation. 3,616,269, Cl. 203-38.

Aerojet-General Corporation: *See—*
Knop, Louis H.; and Mykkanen, John P., 3,614,827.
La Botz, Richard J., 3,615,054.

Agfa-Gevaert Aktiengesellschaft: *See—*
Berthold, Werner; Frank, Karl; and Von Konig, Anita, 3,615,514.
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Kabitzke, Karlheinz; Nickel, Horst; Danhauser, Justus; and Bockly, Erich, 3,615,581.
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Agnellino, Anthony Dale. Hydro therapeutic bathtub. 3,614,952, Cl. 128-66.

Agnew, Kenneth Malcolm, to National Research Development Corporation. Safety sides for beds. 3,614,795, Cl. 5-331.

Agusta, Benjamin; and Sahni, Ravinder J., to International Business Machines Corporation. Process of producing an array of integrated circuits on semiconductor substrate. 3,615,464, Cl. 96-36.2

Agway, Inc.: *See—*
Smith, Stanley B., 3,615,650.

Ahmad, Iqbal, to United States of America, Army. Composites including electroconductive reinforcing material formed by electrodeposition and method of forming the composites. 3,616,300, Cl. 204-38.

Air Reduction Company, Incorporated: *See—*
Greene, William J., 3,615,881.
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Komagata, Kazuo; Nakase, Takashi; Mitsugi, Koji; and Okumura, Shinji, 3,616,234.
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Aker, Walter W.; Brown, Dale H.; Spacil, Henry S.; and White, Donald W., to General Electric Company. Electrically and chemically coupled power generator and hydrogen generator. 3,616,334, Cl. 204-129.

Aki, Osami: *See—*
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Grellsson, Karl Gustav, 3,614,804.
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Aktiebolaget Ljungmans Verkstader: *See—*
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Aktiebolaget Tudor: *See—*
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Aktiebolaget Vargons Mek. Verkstad: *See—*
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Aktiengesellschaft Brown, Boveri & Cie.: *See—*
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Albert, Bertrand Jacques: *See—*
Lenoble, Jean Paul; Albert, Bertrand Jacques; Bochard, Francois G.; Coquard, Jacques A.; and Norture, Roger A.,3,615,471.

Albert, Robert E., to Du Pont de Nemours, E. I., and Company. Process for the preparation of mullite bonded refractory materials. 3,615,778, Cl. 106-65.

Albutt, Kenneth John: *See—*
Garber, Sidney; and Albutt, Kenneth John,3,615,925.

Alcan Research and Development Limited: *See—*
Asada, Tahei; Cooke, William Ernest; and Sajben, Paul John, 3,616,309.
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McLellan, Harold David; and Armour, Walter Keith, 3,616,317.

Alcon Laboratories, Incorporated: *See—*
Schollmaier, Edgar H.; Dewar, Norman R.; and Hecht, Gerald, 3,614,959.

Alden, Don Edward, to Swift & Company. Process for the production of flavored protein foods. 3,615,656, Cl. 99-17.

Aldridge, Clyde L., to Esso Research and Engineering Company. Water gas shift process for producing hydrogen using cesium compound catalyst. 3,615,216, Cl. 23-213.

Alkaline Batteries Limited: *See—*
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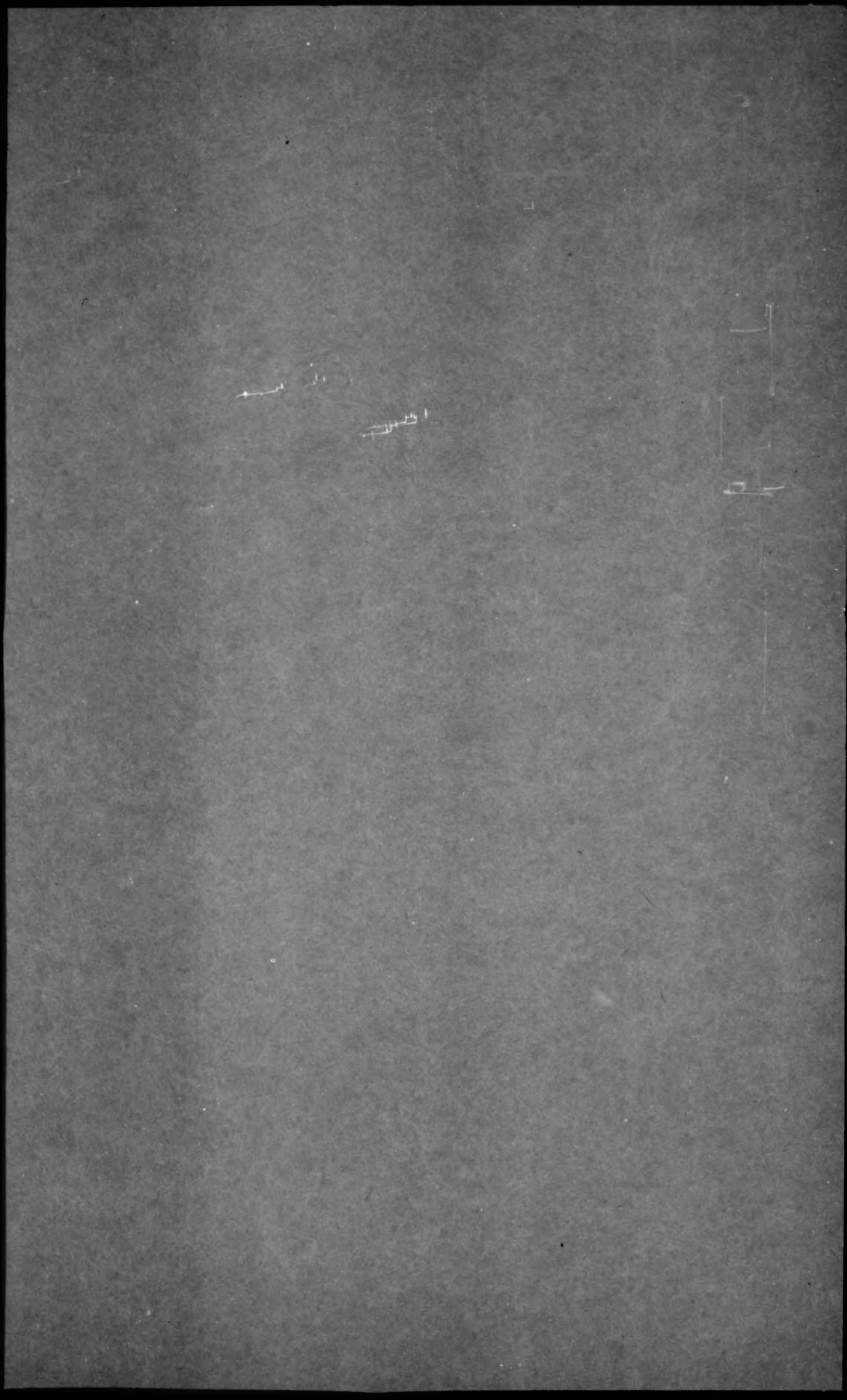

U.S. DEPARTMENT OF COMMERCE
Maurice H. Stans, *Secretary*

PATENT OFFICE
Robert Gottschalk, *Acting Commissioner*